MEMORANDUM

ON

AGRICULTURE IN THE DISTRICT OF CAWNPORE.

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Settlement Officer.

ALLAHABAD:

NORTH-WESTERN PROVINCES GOVERNMENT PRESS.

1877.

THE Director of Agriculture and Commerce, North-Western Provinces and Oudh, will be obliged if purchasers or recipients of Mr. Wright's Memo. on Agriculture in Cawnpore will forward to him any notes made during the ensuing year, and containing either corrections of or additions to the contents of the Memo.

The date fixed for collecting such notes is the first week in January, 1879, after which a new edition will be published, containing additional information from other districts.

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PREFACE.

THE following memorandum pretends to no scientific accuracy, nor is its intention to put forward any suggestions for the improvement of agriculture in this district: this being a matter to be settled by the collation of facts from every district, rather than by experience only over a limited area. The memorandum merely sets forth what has been ascertained by constant enquiry, checked by experiment, during the progress of settlement, and is based on results carefully tabulated and analyzed. The system to which these results are due was instituted by Mr. Buck when settlement officer of this district, and carried on by me on his transfer to the office he now holds. I am greatly indebted to him for the privilege of using the statistics he has collected and tabulated, and for his kindness in giving the benefit of careful supervision to these roughly-strung-together notes.

CAWNPORE,
The 13th June, 1877.

F. N. WRIGHT.

MEMORANDUM

ON

AGRICULTURE IN THE DISTRICT OF CAWNPORE.

PART I.

1. The district of Cawnpore lies between the large rivers Ganges and Jumna, and is intersected by smaller rivers, the Pándu, the Rind (or Arind), and the Sengar, in the above geographical order from north to south, and in the same order of importance as affecting the physical characteristics of the district. The Isan passes through the north of the district for but a short portion of its course, and affects the general character but little. Other smaller streams drain local areas, and mostly discharge into the three principal rivers; of these the "Non," which drains pargana Akbarpur, obtains considerable volume and discharges into the Jumna in zila Fatehpur. A smaller stream also called Non (the term Non implying *smallness*, not *saltness*) drains Bilhaur and discharges into the Ganges.

Physical division of district.

2. We have therefore several doabs in this district, which may be detailed in the following order:—

1.	The Isan	Káli nadi.	4.	The Rind	Sengar.
2.	The Ganges	Pándu.	5.	The Sengar	Jumna.
3.	The Pándu	Rind.	6.	The Rind	Jumna.

Subordinate to which are—

1.	The Rind	Non.	2.	The Non	Jumna.

3. The soils of these several doabs naturally vary considerably, but the district is popularly divided roughly into the Ganges and Jumna parganas, which division would fairly enough contrast the different characteristics of pargana Bilhaur, north Shiurájpur, north Jájmau, and north Sárh Salempur on comparison with Sikandra, Bhognipur, and south Ghátampur, but does not call sufficient attention to the intermediate class represented by Rasúlabád, Derapur, Akbarpur, south Jájmau, south Sárh Salempur, and north Ghátampur.

4. The following table gives the relative positions of the several parganas to the doabs as shown in para. 3:—

Isan-Káli nadi	...	...	...	Bilhaur.
Ganges-Pándu	...	...	...	Bilhaur. Shiurájpur north. Jájmau north. Sárh Salempur north.
Pándu-Rind	...	...	...	Rasúlabád north. Shiurájpur south. Jájmau south. Sárh Salempur south.

Rind-Sengar	...	...	... Rasúlabád south. Derapur. Akbarpur.
Sengar-Jumna	...	...	... Sikandra. Bhognipur.
Rind-Jumna	...	...	... Ghátampur.

5. Unscientifically the popular division of soils speaks of the "dúmat" or loam of the Ganges parganas and the "bhúr" of the Jumna parganas; but the careful classification adopted by the settlement officers gives the following detailed schedule of soils between the Ganges on the north and the Jumna on the south:—

Pargana.		*Doab.*	*Soil.*
Bilhaur	...	... Isan Káli nadi	... Dúmat and bhúr.
Bilhaur Shiurájpur Jájmau Sárh Salempur	... .	... ... } Ganges-Pándu	... Ganges bhúr. Dúmat. Pándu red soil.
Rasúlabád Jájmau Sarh Salempur	... ...	... ... } Pándu-Rind	... Pándu red soil. Dúmat. Rind red soil.
Rasúlabád Derapur Akbarpur	... ...	... ... } Rind-Sengar	... Rind red soil. Dúmat. Sengar red soil.
Sikandra Bhognipur	... ...	... ... } Sengar-Jumna	... Sengar red soil. Dúmat. Jumna soils.
Ghátampur	...	... } Rind-Jumna	... Rind red soil. Dúmat. Jumna soil.

6. It should, however, be noted that the word "dúmat" represents varying degrees of consistency in the soil thus described, being composed of two (*do*) original soils (*matti*), sand (*bhúr*) and clay (*matyár*), *i.e.*, the more northern *dúmat* of pargana Bilhaur, &c., contains a larger admixture of clay, whilst the *dúmat*, so called in the Jumna parganas, contains so much sand as to approach the limit of the soil called *bhúr*.

7. The term "bhúr" also includes varieties of soil from the sand-blown hillocks near the Isan to the hard red sand found in the Jumna ravines: the Pándu and Rind rivers being fringed with a belt of an intermediate soil called locally "pilia," red (or yellow) soil.

8. The "clay" (*matyár*), though an original soil, is practically subordinate to these two broadly defined classes. In this district it is found only in depressions where water lies or slowly drains: it is in fact the collection of the lighter particles of alumina washed out from the higher loams and sands.

9. Broadly, then, we may assume that the district of Cawnpore consists of the soils "dúmat" and "bhúr" representing varying degrees of consistency of the two elementary soils, clay and sand.

10. On the Jumna, however, we meet with small areas of the soils peculiar to the country on the other side of this river (Bundelkhand), namely,

már and *kábar*; the soils called *parwá* and *rákar* are merely modifications of the generic terms *dúmat* and *bhúr*.

Irrigation.

11. The power of irrigation varies like the soil from north to south: from the almost complete irrigation of the Ganges parganas to the total absence of wells along the Jumna.

12. During the current settlement, the character of the irrigation has been enormously changed by the two branches of the Ganges Canal called the Cawnpore and Etáwah terminal branches. The Cawnpore division passes through the Ganges-Pándu doab, a distributary running down the Pándu-Rind Doab as far as pargana Jájmau. The Etáwah division takes the line of the Rind-Sengar doab, and heading the river Sengar tails into the Jumna at Garántha: the last three miles are not dug, and the surplus water is discharged into a ravine at Baksara. Numerous distributaries, large and small (rájbahas and minors), bring the water within reach of a very large area, so that it is not too much to say that the Ganges-Pándu doab as far as Cawnpore and the Rind-Sengar doáb as far as Akbarpur are thoroughly protected from drought. Portions of pargana Rasúlábád, Shiurájpur south of the Pándu, Sárh Salempur north of the Pándu, and a small area in Bhognipur east of the Sengar also receive a considerable amount of water, whilst a new rájbaha included in the system of the new Lower Ganges Canal has commenced to irrigate Ghátampur.

13. The Lower Ganges Canal is to pass through the Rind-Pándu doab for its entire length, a branch crossing the Rind and supplying the Etáwah terminal with water for a further extension of the Ghátampur line. At the same time a large distributary will be brought into the Sengar-Jumna doab, and thus the entire district, except the Ganges-Isan doab, will be brought under canal irrigation.

14. At present the irrigation is distributed as follows:—

Pargana.	Percentage, well.	Percentage, canal.	Percentage, other sources.
Bilhaur	21·2	26·3	11·2
Shiurájpur	19·6	40 9	59
Jájmau	35·6	10 7	3 4
Rasúlabád	48·7	8 6	10·5
Akbarpur	29·3	12·8	3·9
Sárh Salempur	40·4	7 2	3·6
Derapur	6·8	40·5	1·2
Sikandra	2·8	...	2·5
Bhognipur	1·2	57	2·0
Ghátampur	10·4	105	3·9

That is to say, this is the distribution as classified by the settlement officers, and on which their assessments are based.

15. The depth to water varies from 20 to 25 feet in the Ganges-Pándu doab, 25 to 35 feet in the Pándu-Rind doab, 35 to 45 feet south of the Rind to 60 or 80 feet even along the Jumna, where irrigation is practically impossible.

Depth of water below surface.

The method of irrigation I notice below.

16. The agricultural population of Cawnpore district consists of Thákurs, Brahmans, Ahírs, Garariyas, Kurmis and Káchhis in about the proportion of the order in which they are enumerated.

Classes of cultivators.

17. The four first named castes are found all over the district ; the *Kurmis* are more localised, being confined to well defined tracts in Bilhaur, Shiurájpur, Bhognipur, and Ghátampur. *Káchhis* are found wherever a large village attracts them by the amount of available manure or demand for market garden produce ; but in the southern parganas one or two *Káchhis* may be found in many small villages where the proprietor has induced them to settle by the use of a good masonry well.

18. The relative characteristics of the above six classes are well known, and but brief notice is required here. Thákurs and Brahmans grow the ordinary crops, and being compelled by caste prejudices to employ hired labour, occupy somewhat larger holdings which they do not cultivate closely, but, generally speaking, in a careless neglectful manner.

19. Ahírs and Garariyas are good, honest cultivators, whose command of manure makes them raise better crops than we should expect from their unscientific method of cultivation.

20. *Kurmis* are sound cultivators : every able member in the family is in the field from morning till evening ; every one knows the proverb quoted by Elliott in his supplementary glossary—

॥ भली जात कुंविन की खुरपो हाथ ॥

॥ खेत निरावे अपने पोके साथ ॥

" A good caste is the *Kunbín* ; with hoe in hand
They weed the fields together with their husbands."

21. By sheer dint of industry crops are raised even in dry tracts by this class such as enable them to pay much higher rents than any other cultivators except *Káchhis*, whilst where irrigation is complete, as in pargana Shiurájpur, and population is dense, their cultivation approaches that of the real market gardener, the *Káchhi* (or *Muráo*). Round Bhaisáu, Kánsámau, &c., the richest crops are raised and exorbitant rents (where the proprietor is not self-cultivating, as he often is in this caste) demanded and paid. The *Kurmi*, as a rule, occupies a medium-sized, manageable holding, all of which he manures in turn, and most of which (if possible) he will irrigate.

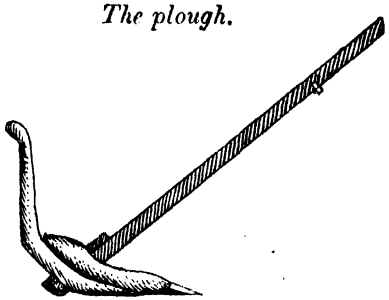
22. The *Kdchhi* occupies a small holding close to the site of the village, in which he raises the vegetables and potherbs most in demand ; depending for these less on manure than on his own labours and that of his family, and constant manipulation of the (already enriched) soil. Where he takes up the higher cultivation, as of potatoes, cane, &c., he manures heavily.

23. Of Lodhas (*Kisán*), another industrious class, there are comparatively few in the Cawnpore district. Their place is supplied by the *Kurmis*, and where they are found they cultivate little, if any, better than Ahírs and Gararíyas.

Instruments of husbandry.

24. The instruments used by the ryot in this district are few and cheap :—

The plough.



25. Consists of the following portions, made of the materials, and costing as noted opposite each :—

Phárá, the share of steel, costing 12 annas.

Purhári, the sole, on which the share is shod ; of *babúl.*

Kurh or *Kurhai*, the step ; of *babúl.*

Paretha, the stilt of *babúl.*

Muṭhia, the handle of *babúl.*

Haris, the beam of *sáku*, costing 12 annas.

Hareni, the cross-bar to which is tied the yoke (*juá*).

Parel
Pachhar
Agmási
Pachmási
} Pegs which secure the different parts.

The yoke consists of—

Mánchi, the upper bar.
Tar-mánchi the lower bar.
Gát or *gatar*, the inner pegs.
Sail, the outer pegs.
} Cost 8 annas, and usually of *babúl.*

Nahna, the rope, often of leather, which attaches the yoke to the beam.

Chonga, funnel of bamboo attached to handle, down which seed is poured into furrow.

26. Thus the actual outlay for plough and yoke does not exceed Rs. 2, but the blacksmith and carpenter receive annual dues, which will be shown

subsequently, for constructing and repairing. The plough lasts three years easily.

Pháora, or *kilwa*, or spade ; iron blade, *babúl* handle ; costs from Re. 1 to Re. 1-4-0, and lasts five years.

Kudár is narrower than the *pháora* and is used for digging cane-fields and wells ; costs about eight to ten annas, and lasts three or four years.

Khurpá, hoe, blade iron, handle *babúl ;* costs four annas, and lasts two years.

Kolába is a kind of hoe which is used for cutting the slips of cane or *arhar* plants ; costs four annas.

Hansya, or sickle ; costs four annas.

Garánsí, chopper, to cut fodder or cane ; costs from 8 annas to Re. 1.

Kulhári, axe, costs 8 annas to Re. 1.

Mái, pahtah, or *patelá* is a beam of wood used as clodcrusher after ploughing : in it are two pegs (*keora*) to which are attached the hauling ropes (*baghan*) ; costs from Re. 1 to Re. 1-8-0.

Páchhi is a flat board for making the irrigation bed ; one man holds the handle, a second pulls it towards himself by a rope. It is also called *kirhá* or *kyári*.

The forms of these tools are so well known that it is needless to represent them.

27. In the south of the district for the heavier soils, such as *már*, the plough or bullock-hoe called " bakhar" is used ; it is thus described in the supplementary glossary :—" It has an iron scythe in the room of a share about 20 inches broad and five deep, fixed to the centre of a beam of wood between four and five feet long and six inches broad. This scythe enters about eight inches into the ground, effectually eradicating weeds and grass, and the beam pulverising the earth as it is turned up."

28. The ryot also has his well gear as follows :—*Pur* or *charsa*, leather bag of buffalo hide, value Rs. 3 ; it holds 13 to 15 gallons.

Kondrá, the iron hoop, which holds the mouth of the bag open, costs about Re. 1.

Bart, the rope, value Re. 1, which, however, is not bought ; the ryot makes it of his own hemp.

Khutti, or *bilári*, the wooden handle, which attaches the rope to the *pur*.

Girri, wheel of *babúl* with two pins of iron, costing eight to twelve annas.

Dhoráhi are the uprights on which the wheel rests.

Patár, the wooden beam at mouth of the well on which the *pur* is landed.

Thus the whole of the well gear purchased costs about Rs. 6 to 8, and will only last about one year.

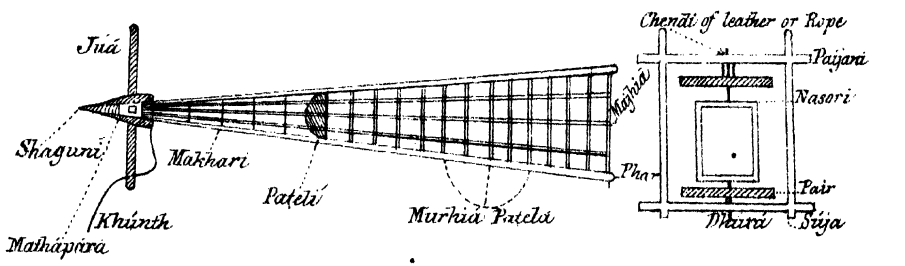
The yoke for the well bullocks is, I am told, usually 8 inches shorter than that for the plough.

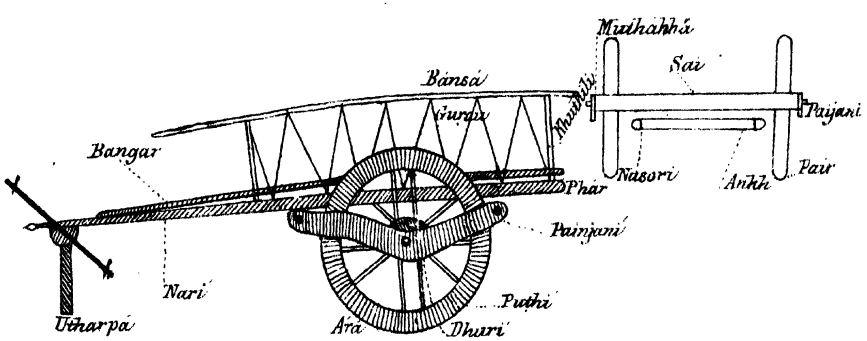
The average value of the tools for husbandry, that is to say, those which the ryot will have to purchase, amounts to Rs. 10, giving an average annual cost (according to the time each lasts) of Rs. 5-11-6.

29. The wood (*babúl* or *chenkar*) the ryot almost invariably obtains from the wild trees on the estate by permission of the landlord, or he grows a tree or two near his own field.

30. It must not, however, be supposed that every ryot has all the tools enumerated in the above list: much work is done by mutual borrowing, and nothing indeed is more common than mutual help in ploughing. Ordinarily, however, a fairly well-to-do ryot will have the majority of the tools; but only those really well off will have a cart.

31. *The cart*, as generally belonging to the cultivator, is a small affair, used for carriage of manure to the fields. The larger carts used for carriage of produce to near or distant markets belong to the well-to-do man who, either on his own account or with prospect of hire from the grain merchant, can afford the heavy outlay necessary. The following is a detailed description, as correct as possible, of this complicated piece of workmanship:—[1]





[1] The names of the different parts vary almost in every pargana, those of the principal parts being most constant. I do not guarantee the correctness of the names I give.

Juá, yoke, of *nim*, *babúl*, or *sirras*; costs about eight annas to Re. 1; *saíl*, pegs on yoke.

Chireya, hooks on yoke, to which *khúnṭh* or ropes round bullocks' necks are tied, and by which draught is distributed.

Náŕí, the rope by which yoke is fastened to cart, reaches length of the cart and is braced by a piece of wood called ?

Bichhúá, hooks, to keep *náŕí* in place.

Shaguní, a pointed piece of wood (*babúl*) at end of body of the cart to which the *phárs* are fastened: the centre piece being called *máthápárá*, and in this the prop (*unthará* or *utharpá*) is fixed.

Phár, the two pieces of wood which form the framework for the whole body of the cart, made of *sáku*, and costing Rs. 5. This is strengthened by a band of iron *patti*.

Májhia, three thin bars which reach whole length: also of *sáku* wood.

Katkíli, pegs and iron nails which are clamped.

Mákhari, three cross-bars to keep *phárs* firm.

Bángar, unfinished poles stretching length of cart along *phárs* to strengthen them, tied together by 12 *sonthás*.

Paṭeli, seat of *babúl*.

Murhiá paṭelá, cross-bars in which uprights (*khuthili*) are fixed.

Bhartua paṭela, cross-bars to allow of loading, forming the bottom.

Bánsa, upper poles fastened to *khuthili* by ropes, *guṛáu*.

Axle and wheels.

Súja, cross-bars to which the heavy beams (*painjani*) on which axle-pins work, are fastened.

Sáí, extra cross-bars, above behind, below before. *Mathakha*, wooden block or fend with pins $\begin{vmatrix} \\ \\ \end{vmatrix}$, keeps *súja* apart from *sáí*.

Ánkh, cross-bar below in middle, to which are fixed—

Násori, in which *dhuri* (iron) is fixed. *Dhuri*, axle-pin.

Chendi are fends of leather or rope keeping wheel off *painjani*.

Pair, wheel, consists of four *puṭhis* (felloes) and four *árá* (spokes.) Nave (*náh*) has two *áwans* of iron inside to prevent wearing, and is bound with a band of iron to prevent splitting, called "ban." Between *áwan* and *náh* is the *momdi* of iron. Edges of wheels are bevilled off (*magar*) to lessen friction. Between *áwan* and *dhuri* is a fend of hemp, *khándan*: *ánkh* is fastened to *násora* by *ghinni* through a *kunḍa* fastened in the *phár*. *Painjani* is fastened to *súja* by *jantras* or movable strings called *kharkaria*.

Ganjia is a hempen bag for carrying hemp and castor-oil *ongan*.

Nails by which *paṭelás* are fastened to *májhias* are called *batásas*.

Sidhwái, prop when wheels are taken off.

Maghzbandi, fastened edges of body.

Cost—

Phár	*sáku*	Rs. 5.
Májhiá		
Bángar	*nim*	8 annas.
Búnsi	*nim*	8 „
Sája	*sáku*	Rs. 2.
Ánkh		
Násori	*babúl*	Re. 1-4 making.
Paṭeli		

Wheels, *babúl*, Rs. 4 to Rs 16 a pair (average Rs. 7.)

Shaguni, *Unthara*, *Máthápára*	*babúl*	8 annas.
Axle	iron	Re. 1.
nails, &c.		Rs. 4.
Rope		„ 1.
Náṛi		5 annas.

The whole about Rs. 30.

Artificial aids to husbandry.

32. The irrigation in this district is now chiefly obtained from two sources, wells and canals. I have described in my 15th paragraph the general local distribution of well-irrigation, and now proceed to describe the well itself.

Wells.

33. Wells are of the following description :—

1. Entirely of masonry, cemented with mortar.
2. Of brick uncemented.
3. Unbricked.
4. Half brick, half unbricked.

The wells lined with a wooden cylinder (*jhákan*) or wattle cylinder (*budzár*) are not made in this district.

The bricks used are of three kinds :—

1. *Gumma*, the large brick ordinarily used in building $12'' \times 9'' \times 3''$.
2. *Makheya*, small bricks $6'' \times 4'' \times 1.''$
3. *Garh*, tile bricks forming segment of a circle according to size of well.

34. The first class of wells is naturally the most expensive.

They are built largely as works of charity for the refreshment of wayfarers, or as additions to temples, &c., and also by zemindars and cultivators for agricultural purposes ; less, however, now-a-days by the former than the latter ; whilst altogether the expense of such a permanent work of utility seems beyond the power of all but a very few. The cost depends of course on the depth to the permanent spring, but the average expense is rarely less than Rs. 300 for

a well with a single run; whilst though the cost does not increase proportionately to the number of runs, the ordinary four-run wells only costing about Rs. 350 to Rs. 400, the large eight-run wells cost from Rs. 500 upwards, more often Rs. 800, and often Rs. 1,000.

35. The method of construction is as follows:—A large hole is dug down to the drip-stratum, approached by steps as in a "baoli." Here a wooden frame *nawár* of *gúlar* and *jáman* or *dhák* strongly clamped together is fixed, and on it the brick cylinder is built up level with the ground. Skilled men (generally divers, *gotá-khor*) dig out (*ubáo, uqár*) the earth with "jhámś," the earth and water being pulled up by cattle. The cylinder is then built up until it rests on the *moṭá* or firm earth, when the spring is tapped with a *sáng*. Some time is allowed to elapse for the cylinder to settle, and the mouth is then built according as the well is for irrigation or merely drinking purposes.

36. A masonry well is generally married with the same ceremonies as are observed in the case of men and women; the owner and his wife taking the parts of bridegroom and bride, presents are given to Brahmans and a feast to friends and relations. As much as Rs. 200 will be spent on this unnecessary ceremony, and no man is so poor but that he will spend Rs. 15 or Rs. 20 in presents to Brahmans. Wells, however, meant for irrigation only are not usually married.

37. The uncemented and small brick wells are generally made by the cultivators, and it is no uncommon custom where the subsoil is favourable to gradually brick up the well from the bottom; at any rate as far up as will prevent the earth falling in from the filtration of the water. The tile bricks cost about Rs. 5 per 1,000, and will, for the entire well according to depth, cost Rs. 25 to Rs. 50: the total cost of the well being from Rs. 60 to Rs. 100. This class of wells, however, forms but a small portion of those used for agriculture, the unbricked (*kucha*) well being almost universal.

In some parts of the district, *e. g.*, Rasúlabád and Ghátampur, *kucha* wells will not stand; but water is sufficiently near to allow of the construction of a masonry well being remunerative.

38. The *kucha* well is constructed thus:—one man digs and a second fills a large basket with the earth, which is drawn up by bullocks driven by a third man; a fourth lands the basket, throws out the earth, and returns. On reaching the stratum where water commences to filtrate, both men in the well dig and fill, and a fifth man spreads the wet earth to dry. When the spring is reached a "sáng" or spear of iron is thrust into the soil, and the water gushes up, and fills up more or less of the lower stratum. This is often firm, when the well is said to be in "motá," but is generally protected by wattle-binding ("birhe") of *arhar* stalks which require renewing every year. (The higher up this binding

comes the better.) The run for the bullocks is then dressed and the well ready for use.[1]

Cost of construction.

39. The cost of construction of course varies according to the depth to water and difficulties which may have to be contended with. The following is the actual cost of construction of a well, in which water was found at 40 feet from the surface and the spring at 60 feet. The men who dig the well get good wages on account of the (sometimes) dangerous nature of their work : instances of the middle stratum falling in and burying the men whilst digging are not rare.

						Rs.	a.	p.
First 40 feet	2 men @ 4	annas, 12 days ...			...	6	0	0
	2 „ @ 1¼	„ 12 „ ...			...	1	14	0
Next 20 feet	2 „ @ 4	„ 6 „ ...			...	3	0	0
	3 „ @ 1¼	„ 6 „ ...			...	1	6	6
Wattle-binding 20 bundles, @ 1 anna		...	...		...	1	4	0
Dressing run, 2 men @ 1¼ anna, 2 days		...	...		...	0	5	0
				Total cost Rs.	...	13	13	6

40. But as grain is usually given in part payment of wages, 2½ seers a day to the diggers and 2 annas cash, and ¼ seer of parched grain to the others and one anna in cash, the total cost varies according to the price of grain, being Rs. 8-10-0 in cash plus 2½ maunds of grain.

41. Thus the average cost of a well may be calculated at about Rs. 10, but as a fact the cost varies from as low as Rs. 3 to Rs. 15 or 16 ; much of the work, however, amongst the lower caste is done by the cultivator and his relations themselves ; only the digging has to be done by trained hands, generally of the chamár caste, called *ku'iyá* for this reason. They last generally from two to four years, but in the last five years numberless wells have fallen in from the rise in water-level. This rise is due partly to the presence of canal water and partly to the heavy rains of 1870—74. The approach of settlement operations may also be credited with some of the disused wells.

42. In most wells after the upper firm ("porhi") soil which may be 20 feet in depth, a stratum of sandy loose unbinding soil is reached, from 8 to 12 feet in thickness, called "chitta." When the water-level rises as high as this the well invariably falls and is useless. It is not uncommon to brick over this stratum alone, leaving the remainder of the well unbricked ("nangá").

[1] Parts of a well :—

Man or *jagat*, the mouth (if of masonry).
Chuldr, receptacle for water as discharged from bucket.
Paindi, run for cattle.
Dhúráhi, wooden upright to receive.
Girri, wheel.
Lildri, run above ground.
Khuriya, run below ground.
Paindha, fodder trough in middle.

Curiously enough, however, in the south of Sikandra the water-level is said to have *fallen*, but with the same result, *viz.*, the falling in of the wells.

43. It would be tedious, if possible, to detail the various strata met with in digging wells; they vary from village to village, and even in the same village, and nothing but most minute investigation, only profitable for any special project, would give satisfactory results.

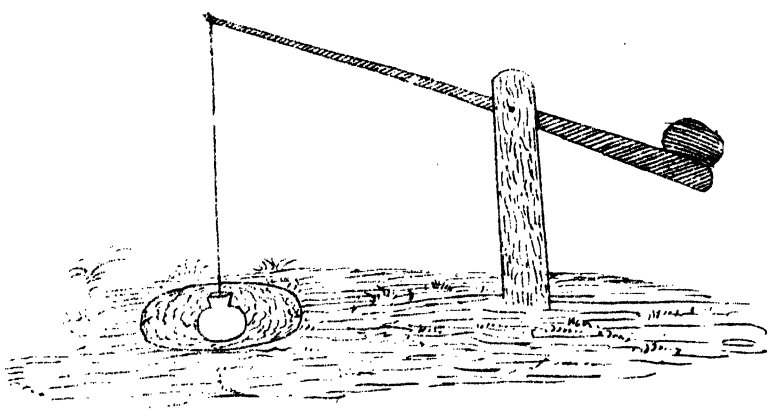
44. An ordinary well with one run will water 5 biswas (one-eighth of an acre) a day, if on the edge of the field; less, if at some distance: this is the work of one pair of bullocks, who have to be allowed a rest for an hour or so at noon. It is not unusual to work two pairs of bullocks in the day when as much as 8 biswas can be watered, but this depends on the supply of water.

45. The cost of well irrigation is most difficult to calculate, so many elements of variation enter into it. One man with his family will do all the work, another has to employ hired labour; cattle differ; depth to water differs; amount of water available differs; some wells give a constant supply, in others not only has the water to be slowly used, but oftentimes given for the well to replenish. The fairest method in my opinion is to calculate the cost of the entire agricultural operations for a whole year of any one cultivator: this alone can give a trustworthy basis for the comparison of irrigation from wells with other means of irrigation.

46. The following is the minimum cash outlay for irrigating one acre:—

		Rs.	a.	p.
Hire of pair of oxen with gear and driver, 8 days @ 8 annas per diem	...	4	0	0
Wages of 2 men for 8 days @ 1¼ anna per diem, lifting and distributing water	...	1	4	0
Total Rs.	...	5	4	0

47. In low lands where the water is close to the surface (*e. g.*, the *kachhár* lands of pargana Jájmau) the lever well or "ḍhenkli" is commonly



used. The hole (*choha*) is about 16 feet deep, in which 5 feet water collects. The beam (*dhenkli*) works on a pivot in a fixed fulcrum or support (*khamb*) at two-thirds of its total length from the well, and is weighted at the outer end with a lump of clay (*chák*). An earthen pot (*ṭhilya*) is suspended to the *dhenkli* by a (*bareri*) rope (finer than used for the ordinary well); the rope not being slung round the pot outside, but fastened to a slip of wood (*kilia*) which catches in the neck of the pot inside. A *dhenkli* well will water at the outside 2½ biswas (one-sixteenth of an acre) in the day, and will cost, including binders (*birhe*, of light material, such as *bájra* stalks, *madár* or *akowa* stalks, and *jháo*, generally found on the banks of the Ganges, where these wells are used), Re. 1-12-0.

Canals.

48. Canal-irrigation is now rapidly supplanting well irrigation over a large portion of the district, both on account of its facility and because the rise in the water-level, largely due to the canal, has caused the destruction of wells, and the cultivator is driven, whether he will or no, to take canal water as his only means of irrigation.

49. The method of canal irrigation is either by flow (flush, "tor," "katwá") or lift (*dál*). The former process is simple enough; the cultivator simply cuts the field boundary and lets the water in from one irrigating bed to another till his field is watered. He can irrigate in this way three acres in the day. The second process, or "lift," is that of hoisting[1] the water up in a basket ("beri," "lahri") made of split bamboo, and costing 2 annas, from the reservoir ("nándá)" to the catch-basin ("jhulár"), from whence it flows to the field requiring it, in which it is distributed as above. Sometimes more than one basket is used at one lift, sometimes more than one lift is required to bring the water up to the proper level. By this process half an acre can be irrigated in one day, and the cost is as follows:—

Flow.

	Rs.	a.	p.
Canal charge per acre (cereals)	2	4	0
One man distributing for one day	0	1	6
One man watching watercourse to prevent leakage	0	1	6
Total cost ...	2	7	0

Lift.

	Rs.	a.	p.
Canal charge per acre (cereals)	1	8	0
Four men to each basket, working turn and turn about, 2 days, @ 2 annas cash and ¼ pice *chabena* per diem	1	2	0
One man distributing, 2 days @ 1½ anna per diem	0	3	0
One man watching watercourse (one of lifters off duty) ...			
Total cost ...	2	13	0

[1] The man lifting stands on the paintha.

50. Thus apparently canal irrigation is much cheaper than from wells, and in fact it would be to any one but the cultivator himself. Canal water, however, demands an actual outlay of cash; well irrigation is carried out by labour and material already present and not necessarily purchased, so that (as I will show afterwards) there is no cash expenditure. At the same time Mr. Buck has sufficiently proved the economy of canal irrigation to the cultivator in "liberated labour," whereby he can devote the labour of his family and cattle to the production of more valuable crops, *e.g.*, indigo and cane, which follow the introduction of canal irrigation.

51. The comparative value of canal and well irrigation is a question that has received as much attention as any other in Indian agriculture, but I do not know that any certain result has been arrived at by experiment. Nor, indeed, do I believe that any hard-and-fast rule can be laid down in matters which contain so many points of variation. Complaints are rife against canal water, chiefly pointing to one main result,—decrease in the productive power of the land so treated. From the first I gave much consideration to these complaints, and I cannot do better than quote my Shiurájpur report on the conclusion at which I arrived :—

"The complaints invariably made by the peasantry against the canal are—(1) that it destroys wells; (2) that it chills the ground; (3) that it encourages a strong growth of grass; (4) that it does not produce a similar outturn to well irrigation

"(1.) The first complaint is easily met by the fact that where it pays to keep up non-masonry wells, as for vegetables, &c., they are always kept up, and that though it is undeniable that the filtration does tend to make the wells less durable, the argument is really one *post hoc, ergo propter hoc;* the ryots have failed to keep up their wells, and therefore attribute their destruction to the cause that has led to their disuse. It is a question, too, to what distance this filtration affects the subsoil. I have seen wells quite close to a canal working away merrily, and I have seen old masonry wells at a considerable distance from the canal said to have had the water-level raised in them by it. Again, the constant rain of the last three years has indubitably raised the water-level, and wells now fall in the sandy substratum which is above the brushwood binders, and which commencement of percolation formerly did not reach.

"(2.) The second argument is so far tenable as that in certain places readily recognizable, and for which allowance is readily made, the ground has become soppy, and indeed unculturable. I confess, too, that I consider the extravagant use of canal water, especially when obtainable flush, so different from the careful distribution of well water, where every drop is prized, has a great effect on the land, which I am not scientific enough to call by any

other name than chilling. Experience is doing much to counteract these effects ; the water is more sparingly applied, and I have one instance of a ryot endeavouring to restore the original condition of his land by allowing it to remain fallow.

"(3.) This complaint is based on entirely false grounds. I admit being much misled by it at first. In my earlier village notes I have many hesitating admissions of strong growth of grass. Subsequent experience, confirmed by admission of more intelligent cultivators, however, has taught that it is solely due to the constant and incessant rain, especially last year, which did not admit even of the hot months killing off the weeds, and they therefore getting head, conquered the plough bullocks, and ultimately led to much land being left fallow in the poorer villages, where cattle were scarce or poor, and money to pay hand-weeders was not forthcoming.

"(4.) This objection can only be satisfactorily proved or disproved by a long course of experiment. For two years the accuracy of experiments made with the express object of comparing the outturn from well and canal irrigation has been disturbed by the otherwise opportune rains of the cold season. It is at all times difficult to obtain such specimens as by the removal of inequalities admit of exact comparison, and this year was especially unfortunate, as many of the villages which use canal water had taken one watering, when the rain fell, and the excessive moisture thus induced encouraged the rust which in the weaker crops did so much mischief during the long-continued fogs of the early part of January.

"That this objection loses all its force when properly met is amply proved by the circumstances of the village Mustah. This village, densely populated with *Kurmis*, is cultivated throughout nearly its entire area like a garden. It is watered throughout from canal, and the finest crops are grown all over it. More than this, its rent-rates, nearly the highest in the pargana, date, according to the unanimous voice of the residents, from the introduction of the canal. They have found, as they have it, at hand the greatest antidote for deteriorating effects (if any) of canal-water,—manure. Wherever manure reaches, the crops are as fine as those irrigated from wells. As, however, the manured area only forms but 28 per cent. of the whole, the question resolves itself into the simple form of manure supply."

52. Further experience has in no way altered the opinion therein arrived at, which I may condense into one assertion, *viz.*, that any injury resulting from canal irrigation is positively and entirely the fault of the cultivator. He swamps his land, making a very quagmire of it; he double-crops and takes out all the soil can give with little or no return ; he slops and wastes the water about roads and waste patches ; and if there is "reh" in the soil he will not

protect his fields by a little bank against the inevitable introduction of the defertilising salt, and then complaints of decreasing fertility, sickness, &c., &c. I can only say what has been said by higher authority than my own—"he must learn." When he takes just so much water as he wants, hoards it, and doles it out as he does his precious well water, saves his farm manure, or begins to employ substitutes (as is already the practice in some places, by using the refuse of indigo vats), we shall hear no more of the injuries from canal irrigation, but its undoubted cheapness will make it a benefit not to be measured only by its value as a protection against famine.

53. I do not here make further reference to injuries caused by the presence of canals *per se*, interruption of drainage, &c., for these are being remedied as fast as money is forthcoming, nor to the question of taking canals where ample well irrigation already exists,—a proposition, I hope, that has now no supporter. I sum up the benefits to the Cawnpore district from canal irrigation thus: (1) increased production of cane wheat and indigo (the latter enormously); (2) cultivation of lands which would not for many years have been brought under the plough; (3) substitution of a certain supply of water in some places where wells must always have been precarious. But in a word I consider the canal was never wanted *generally* where it has been brought in Cawnpore, except in parts of pargana Derapur, the portion watered at the end of the Etáwah branch, and the new extension into Ghátampur (which, however, has to pass through a tract amply irrigated from wells). The proposed canal through parganas Sikandra and Bhognipur will do unmixed good. This tract is absolutely dry, suffers fearfully from the mere suspicion of drought, is fairly well populated, and chiefly by the industrious class of *Kurmis*, with, as yet, considerable numbers of cattle: all of which points are of the greatest importance in considering the question of introduction of canal irrigation or not. The effect of canal irrigation on *rents* is more fully described in a settlement report.

Irrigation from other sources.

54. A considerable area in the district is also watered from tanks or, more properly speaking, ponds and lakes, as the word tank implies an artificial reservoir, of which, though there are several in the district (and some made at the great famine as relief works), no use is made for irrigation. Nearly every village site has its pond (tál,[1] taleyá, pokhar, garheyá), large or small, from which the earth of which the houses are built has been dug, and here and there in the district are a few large jhíls (Gogomau, Jahángírábád, &c.) whence more or less water is obtained for irrigation. It is of course a great defect in this class of irrigation that it fails when most wanted, that is, in drought. I believe that a more liberal system of filling ponds in such circumstances from the canal is now sanctioned, and the opportunity is one not

[1] A deep tál is called meghi.

to be thrown away; for the ryot has a decided liking for having his water available when he wants it, stored, that is, to hand, not dependent on the supply in the canal, which varies week by week. He does not object to lifting his water; indeed he often takes canal water down a slope at the end of which he will have to lift at some expense.

55. Few natural reservoirs give more than one watering, because the demand is so great, every one being entitled to one watering if he can get it, that the supply does not hold out.

56. The water of the ponds near villages is most valuable from the collected drainage of the houses and cattle-pens, and it is rich in the elements of manure. Fields near such ponds, and irrigated from them, will always fetch good rents, though as a fact zemindars very often monopolise the water for their "sír;" and as they seem regardless of expense in the matter of lifts, I am led to believe that they can only afford this irrigation by having recourse to the unpaid labour of the village menials. (It is well known that zemindars are entitled to get one ploughing from each cultivator's plough, and as there are always certain *chamárs* and *koris* called "gáonkama," I imagine their labour is utilised for the purpose of lifting water. They are paid by annual doles from the threshingfloors of the cultivators.) Cultivators avoid the expense of lifting by mutual assistance: hence Mr. Buck saw as many as four lifts at work from the Isan river, and I have myself frequently seen one lift of two baskets at a lake, one lift of two baskets between the lake and field, and one lift of one basket at the field. The number of lifts increases of course as the water gets lower in the reservoir.

57. The *method* of irrigation is the same as described under "Canal."

58. There is some irrigation from the river Isan, but from none of the other larger streams, which are too deep to allow of water being lifted with profit. Refuse water from the canal is passed down small streams like the two rivers Non, and used unpaid for by the villages on either bank.

Manure.

59. Except in the rare instance of the refuse from indigo vats being available, or camping grounds being near, the cultivator has only his own manure heap to look to for the improvement of his land. This he commences to form when the rains fall, for during this season he cannot dry his cowdung fuel-cakes. For the remainder of the year all his house sweepings, ashes, refuse, straw, &c., are thrown on the heap; but though the ash of the fuel itself contains a large proportion of plant-food, the most valuable portion of the heap is that which is at the bottom, as containing more unmixed droppings from his cattle.

60. The result of enquiry tested by actual observation gives, roughly speaking, an average of sufficient manure for half an acre as collected from

the droppings of one yoke of oxen, to which is added all the refuse available : as many cultivators keep a cow or a buffalo or two for milk, enough manure for one acre in the year will be ordinarily collected. The average holding is six acres, more in the lighter soils of Sikandra and Bhognipur, less in the stiffer soils of Rasúlabád, hence the land will be on the average manured every sixth year.

61. One hundred maunds, or from 10 to 12 small cartloads, is all the manure usually available for even his sugarcane (cane is, however, largely grown on a co-operative system, when more manure is available, as much as 800 maunds being applied per acre).

62. More cattle are kept by the Ahír and Gareriya classes where there is large pasturage, as in úsar plains, large jhíls (which are dry in the hot weather) and ravines; hence it is found that in such cases higher rents can be, and are paid : at the same time much manure is lost in the ravines.

63. Near encamping grounds manure is purchased at Re. 1 the cartload of fuel-cakes (of which one small bullock cart will carry 1,300). The cakes, however, are not such good manure as ordinary farmyard manure, in the proportion, it is said, of 2 : 3. Thus at Chaubepur advantage is taken of the large supply of manure available to grow potatoes.[1]

64. In the neighbourhood of Cawnpore, however, so great is the demand for fuel (especially dung-cakes which sweetmeat-makers use exclusively) that the cultivators rob their fields to earn a few pice daily : and on the roads leading to the city, every morning may be seen troops of women carrying baskets of fuel for sale.

65. Near large villages the refuse and nightsoil from houses of the better classes is available and sold by the sweepers who collect it, and wherever there is a large non-agricultural population the house sweepings or the dung of a pony or a goat or two is purchasable at 2 to 4 annas a cartload, or, as in the case of Gareriyas (goatherds), exchanged for grain.

66. In only one village—Púranpur (says Mr. Buck)—did he find the custom prevail of putting litter under cattle to become saturated with their droppings, and in this instance only during the cold weather up till February, after which the stall had to be kept clean to prevent vermin and heat.

67. I do not know that we can do anything to improve or add to the manure supply at the command of the cultivator. As cultivation increases, grazing lands become more and more distant; sometimes also the canal, sometimes the railway, cuts off valuable grazing. Planting *babúl* and *dhák* trees

[1] "Kandhe" are large semicircular fuel-cakes, about 50 or 60 to the maund, and sell *in the bazar* at from 8 to 12 maunds the rupee. "Uple" are small round cakes, about 150 to the maund, and sell at the same price.

would, it is true, provide a supply of fuel, but in instances where, either at their own instance or at my persuasion, zemindárs have taken up this idea, it has been confessedly to provide material for market; the cultivator is limited in his opportunities of planting for himself, by the fact that he may only usually sow on his own field boundary, and also that he wants the wood for agricultural implements. A large supply of wood in Cawnpore might keep some of the manure in the villages, but this would only affect a very limited area. The climate would seem against the adoption of a plan of stall-feeding in a large way; but it is notorious how wasteful cultivators are of the opportunity they have even of making refuse straw, which is useless as fodder, useful as manure by being used as litter.

NOTE.—The local bígha contains 2,450 square yards, and is ·506 of an acre. The maund is 40 seers of Rs. 80 each seer.

PART II.

68. THE following are the detailed statistics of the cultivation of each plant grown in the district, arranged on a system suggested by Mr. Buck. The accounts given under the statistical columns are as full as enquiry could make them, but I beg that allowance may be made for defects, considering the difficulty of obtaining, under our system of work, full information for every pargana:—

Crop statistics.

JWÁR.

Kharíf

NAME OF CROP.			STATISTICS PER ACRE.								
English.	Hindi.	Botanical.	Ploughing.	Time of sowing.	Seed.	Weeding.	Reaping.	Threshing.	Winnowing	*Average outturn.* Grain.	Straw.
Primary.					M. s. c.					M. s. c.	
Large millet	*Jwár,*	Holcus sorghum	2 to 4	*Asárh,*	0 2 0	Once or twice.	8 or 10 men	1 pair of oxen in 2 days.	4 men	7 0 0	44 mds.
Subordinate.											
	Arhar,	...	...	...	0 2 8	20 to 30 men to the acre at 1½ ánna per diem.				6 0 0	15 mds. bhúsa & stalks.
	Urd or *Múng.*	...	...	...	0 1 0					1 8 0	
	Til,	...	...	...	0 0 4					0 24 0	2 mds. 16 seers bhúsa.
	Lobia (*Rosa*)	...	...	...	0 0 8					0 20 0	
	Hemp,	...	...	...	0 2 0					0 12 0	

Detailed account.

Varieties.

1. White; with close compact ears, subdivided into (*a*) single grained, (*b*) double grained. The best sort.

2. Grey; spread ears, "jhalara." Inferior.

3. Red; can be sown later than other sorts; rarely sown except for some special reason, such as loss of earlier sowings: the flour is hard and indigestible.

4. *Cháhcha;* the grain lies concealed in the husk, which is hard, and birds do not touch it in consequence.

Jwár is also called *jundi* or *junri.*

Preparation of land, manure, &c.

Jwár is generally sown in good land, *i.e., dúmat.* In the home lands it is sown thick in small plots and cut green for fodder. In the middle lands it is often manured, but is chiefly sown in the outlands unmanured.

Ploughing. The ground is ploughed from two to four times, but rarely more than twice.

Sowing. The seeds of all the crops (except *lobia*) are mixed and sown broadcast, ploughed in, and the "patela" or clodcrusher run over: the *lobia* is planted by hand on ridges (*kuṇr*), about 10 rows to an acre. If rain falls immediately after sowing, the seed will not germinate, and a fresh sowing is necessary. Seed is generally selected, *i.e.*, fine heads are set aside for this purpose.

Intermediate operations between sowing and harvest. *Jwár* is weeded once, or at the outside twice, but when about 3 feet high is ploughed or dug up by the "kudár" (this operation called "guṛái" from "goṛna"), to break up the caked earth and allow moisture to filter down. It must be watched for 25 days before cutting, morning and evening, to keep off the birds, and at night for protection against thieves and wild animals: a man is generally hired to watch at night at Rs. 2 or Rs. 2-8-0 a month, in the day the cultivator or his sons manage it.

Harvest reaping. *Jwár* is cut in the end of *Kátik* or beginning of *Aghan* (middle of November). First the *urd* and *múng* are collected, then the *til* and *lobia;* lastly the *jwár* is cut with the sickle, generally only the heads (*bhuṭṭá*) at first, leaving the green stalks in the field to be cut as wanted, cattle preferring them soft. The reapers get one bundle in 20. The *arhar* stands till *Chet*, and is cut with the rabí.

Threshing. Each crop is threshed out in the usual way separately.

Winnowing. Each crop is winnowed in the usual way.

Outturn. The average outturn is about seven maunds per acre, with 6 maunds *arhar*, 1 maund 8 seers *urd* or *múng*, 24 seers *til*, and 20 seers *lobia*, but the following is the result of a cutting in Mandoli, soil rich loam, manured the previous year with 220 maunds, ploughed three times and weeded twice:—

Area cut.	*Produce in Government maunds, Rs. 80 to seer.*			Rs. a. p.
1 bígha 11 biswas (about ⅘ths of an acre).	Grain 12 maunds	15 seers.	Value	28 0 0
Twice weeding, cost Rs. 2-8-0.	Set aside for seed	25	(15 seers of unthreshed heads).	
				Rs. a. p.
Rent of field, Rs. 4	*Urd*	20 „	Value	1 0 0
	„ chaff 1 maund	5 „	„	0 5 0
	Fodder 186 bundles with an average of 179 stalks to a bundle.			4 8 0
Total cost Rs. 6-8-0			Total value of crop	33 13 0

Profit on crop Rs. 27-5-0 (but this was an exceptional case).

Uses. *Jwár* flour is made into bread, but only eaten by the poorer classes: wheat flour is often adulterated with *jwár* flour. The stalks (*karbi*) are most excellent fodder: they are chopped up with a *garási* and mixed with other green food (grass, leaves, especially of castor-oil plant).]

Cost of production.

One acre *jwár*.	Cost.			Produce.	Value.		
	Rs.	a.	p.		Rs.	a.	p.
Ploughing	0	10	0	*Jwár* 7 maunds @ 1 maund per rupee.	7	0	0
Ditto and sowing	0	10	0				
Seed	0	8	3	*Arhar* 6 maunds @ 1 maund per rupee.	6	0	0
Clod crushing	0	5	0				
Weeding	1	4	0	*Urd* 1 maund and 8 seers @ 24 seers per rupee.	2	0	0
Thinning (*guṛái*)	0	5	0				
Watching (proportional share) ...	1	0	0	*Til* 24 seers @ 12 seers per rupee.	2	0	0
Cutting	0	10	0	*Lobia* 20 seers @ 1 maund per rupee.	0	8	0
Threshing	1	0	0				
Winnowing	0	3	0	Hemp 12 seers ...	1	0	0
Rent	6	0	0	Fodder *jwár* 132 bundles or 22 maunds.	6	0	0
				Arhar stalks and bhúsa ...	8	13	6
				Urd, bhúsa ...	0	10	0
Total cost ...	12	7	3				
				Total produce ...	28	15	6
				Deduct total cost ...	12	7	3
				Balance of profit ...	16	8	3

Injuries. *Jwár* is liable to following attacks:—

"Agia" or "makari," a spider, attacks the bud before the flower forms, and no grain is produced; chiefly due to want of rain. *Thuntha* attacks the pith in *Bhádon*; chiefly due to want of rain. "Lassi" also attacks *Jwár* in drought.

Area. The area recorded under this crop in the measurement papers is 162,184 acres.

General. In the experiment above noted, after threshing and winnowing, the grain was heaped by the cultivator in the shape of the figure 8, its head towards the Ganges and a sickle (or hoe) and a branch of *madár* (*akowa*) in honour of Madár Sháh (of Makanpur) stuck up in it. All round the heap a line of cowdung was traced and the smoke of a sacrificial fire made to blow upon the heap to keep of the "jinns." One double-handful (*lap*) was given in honour of Sháh Madár, one to the *bhát*, one to the *gangáputr*, one to the *parohit*, and half seer each to the carpenter, the *lohár*, the barber, and *kahár*, value 4 annas 6 pie.

BAJRA.
(*Kharíf.*)

Name of crop.			Statistics per acre.								
English.	Hindi.	Botanical.	Ploughing.	Time of sowing	Seed.	Weeding.	Reaping.	Threshing.	Winnowing.	*Outturn.* Grain.	*Outturn.* Fodder.
Primary.					S. Cbt.						
Small (bulrush) millet.	*Bájra.*	Holcus spicatus or Pencillaria spicata	Twice.	Sáwan	2 0	Once; 16 men to an acre @ 1½ anna, if oftener 10 men.	12 men in 2 days.	1 pair of oxen in a day.	2 men	6 to 10 maunds.	30 to 32 maunds.
Subordinate.											
	Arhar,	...	...	...	2 8	...	...	...	...	2 maunds.	5 maunds bhúsa and stalks.
	Urd or	...	...	...	2 8						
	Moth, or	...	...	...	2 8	...	8 men	...	...	1 maund 20 seers.	
	Múng,	...	...	...	2 8						
	Rosa,	...	...	...	0 4						
	Til ...	...	...	...	0 2	...	2 men.	...	...	20 seers to 1 maund.	

Varieties. None: several heads of *bájra* are often seen on one stalk (never of *jwár*).

Preparation of land manure. *Bájra* is generally sown in sandy and poor soils, but as it can be sown later than *jwár* is sometimes substituted for that crop if the first sowing is lost for any reason. It is rarely if ever manured. It is chiefly grown on the sandy soils of the Ganges, Sengar, and Jumna, especially the latter, where it is also grown in the *kachhár*.

Sowing. The seeds of the different grains are mixed and sown broadcast, after which they are ploughed in and the "patela" or clodcrusher is run over the field to level it. The lobia or "rosá" is sown on ridges (*kunṛ*) in lines about eight or ten to the acre.

Intermediate operations. *Bájra* is not often weeded more than once, the men being paid one anna and a quarter per day. This is when it is a couple of inches high, but when a foot high it is ploughed or dug up (*guṛái*). It is watched for about 20 days before cutting.

Harvest, reaping. The heads are cut off with a sickle, the stalks left standing, to be cut as wanted.

Threshing. Is threshed out as usual.

Winnowing. Is winnowed as usual.

Outturn. The outturn of *bájra* varies very much. It is grown on the very poorest land, and little cared for or watched. The undergrowth (*moṭh, múng*, &c.) is often more valuable than the main crop, and the grass amongst the *múng*, &c., is valuable for fodder. Eight maunds is a very good average outturn for an acre, all circumstances being favourable.

Uses. The grain is made into flour for food, the cobs burnt, and the stalks used for fodder, but not so prized as those of jwár, as they contain less leaf-food and more silica.

Cost of production.

Bájra one acre.	Cost.			Produce.	Value.		
	Rs	a.	p.		Rs.	a.	p.
Ploughing	0	10	0	*Pairá* 8 maunds at 30 seers per rupee	10	10	0
Ditto and sowing	0	10	0	Fodder 80 bundles or 30 to 32			
Seed	0	2	0	maunds...	3	0	0
Weeding	1	4	0				
Watching (proportional share) ...	1	0	0	Total produce ...	13	10	0
Cutting	0	11	0	Deduct total cost ...	8	1	0
Threshing	0	6	0				
Winnowing	0	6	0	Balance profit ...	5	9	0
Rent	3	0	0				
Total cost Rs. ...	8	1	0				

Injuries. *Bájra* is very susceptible to the east wind; if it blows in *Kwár* the flowers die off and fall; the grainless heads are called *Kandwa*.

Area. The area recorded under this crop in the measurement papers is 37,961 acres.

COTTON.

(Kharíf.)

Name of crop.			Statistics per acre.							
									Outturn.	
English.	Hindi.	Botanical.	Ploughings.	Time of sowing.	Seed.	Weeding.	Picking.		Kapás.	Stalks and bhúsa.
Primary.					S. C.					
Cotton	*Kapás*	Gossypium Herbaceum.	2 to 4.	Asárh.	7 0	3 times; 1st time 30 men, 2nd time 15 men, 3rd time 15 men.	From Kártik till end of Aghan, every 3rd day.	Pickers paid by 11th share of produce.	4 to 6 maunds.	
Subordinate.										
	Arhar	...	...	...	10 0	...	...	...	4 maunds.	10 maunds bhúsa and stalks.
	Til ...	...	...	...	0 2	...	...	...	30 seers,	
	Urd ...	...	...	...	1 0	...	...	...	10 „	20 seers.
	Castor-oil plant,	...	...	...	1 0	...	...	...	½ maund.	
	Hemp,	...	...	...	1 0	...	...	...	10 seers.	

Varieties. None.

Preparation of land, manure, &c.

Cotton is almost invariably sown in the best land, *i.e.*, the gauhán, in villages cultivated by the less industrious classes; but the industrious classes devote their gauhán to even higher cultivation and grow cotton in the "manjhá." It is generally, though not always, manured with 50 to 80 maunds the acre, but is always grown in land habitually manured, except in the poor lands of Sengar and Jumna ravines, where it is often grown as a first crop on newly broken-up land, to strengthen it by the leaves, &c., shed by the plant.

Ploughing.

The land is well ploughed, certainly twice, seldom oftener, as it is important to get the seed in quickly after rain. A yoke of oxen will plough an acre in two days.

Sowing.

The cotton seed is rubbed in cowdung to keep the seeds apart and sown broadcast, after which the plough is run through the soil and the field levelled by the "patelá" if the soil is at all hard and stiff. The *arhar* is then sown in rows about five yards apart to protect the cotton, but at the same time give it light and air;[1] and the rows run east and west, because, as *arhar* is peculiarly susceptible of frost, only the westernmost trees, which first feel the nipping wind, suffer. The *urd*, &c., are sown separately, but *urd* is generally added when it is seen the cotton crop will be light.

Cotton sown in *Asárh* is ready by "naulurga," (*Kwár*); that sown in *Sáwan* later.

Intermediate operations between sowing and harvest.

Cotton must be carefully weeded at least three times; for the first two weedings at least 12 men must be hired (the estimate in statistical column is excessive). The latter weedings may be done more at leisure by cultivator's family. Weeders are paid 1¼ anna to 1½ anna and "chabená," or 2 seers *bejhra* in lieu of all.

The cotton plant flowers in *Kwár*, and the bolls (*gúlar*, *bhiṇá*) begin to burst in *Kátik*, from which time till the end of *Aghan*, or sometimes later, the cotton is picked, by some every day, by others on alternate days. The women of the household usually do this work, helped, if necessary, by other women, who get one-eleventh of the produce.

Outturn.

To pay the cultivator the outturn should not be less than five maunds to the acre: but in two experiments made the outturn in one field (*gauhán* manured and ploughed twice) was only 2 maunds 4 seers to the acre, and in the other (a *barhá* field manured the previous year and ploughed twice) the outturn was only 1 maund 16 seers to the acre. Both these fields suffered from frost, and loss was sustained in both instances. Of 289 men from whom I enquired (in pargana Akbarpur) as to the average outturn, only 48 admitted four maunds to the acre, the majority giving only two maunds; a few from four maunds to eight maunds.

Uses.

The cotton is used for clothing, the ryot often retaining what he wants for his own use and selling the remainder, generally uncleaned. The seeds (*binaulá*) are useful as butter-producing food for cows. The heads of the plant are given to cattle as fodder and the stalks are burnt or used for *bírhas*, but are inferior to *arhar* stalks. The subordinate crops are the same as in *jwár* and *bájra*.

Manufacturing processes. See head *dhuná* or cotton cleaner.

See also an admirable note by Mr. Fuller, Assistant Collector, on weavers and weaving.

[1] Some say to measure the picking.

Price. Has fallen greatly since the termination of the American war; it now averages about eight seers the rupee, or Rs. 5 the maund.

Cost of production.

Cotton (kapás) one acre.	Cost.	Produce.	Value.
	Rs. a. p.		Rs. a. p.
Manure	3 6 0	Cotton, 4 maunds at 7 seers per rupee	23 0 0
Ploughing once	0 10 0	*Arhar*, 4 maunds at 1 maund per	
Ditto and sowing ...	0 10 0	rupee...	4 0 0
Seed	0 9 0	*Urd*, 10 seers at 20 seers per rupee	0 8 0
Weeding	4 0 0	*Til*, 30 seers at 12 seers per rupee	2 8 0
		Hemp, 10	1 0 0
Picking 1-11th share ...	2 0 0	Castor-oil seed, 20 seers at 15 seers	
Cutting *arhar*	0 5 0	per rupee	1 6 0
Ditto *til*	0 5 0	*Arhar* stalk and bhúsa ...	2 0 0
Ditto castor-oil plant ...	0 5 0	Castor-oil trees, 4 bundles ...	0 8 0
Rent	8 0 0	*Urd* bhúsa...	0 1 6
Total cost Rs. ...	20 2 0	Total produce Rs. ...	34 15 6
		Total cost Rs. ...	20 2 0
		Balance profit Rs. ...	14 13 6

Injuries. The bud is attacked by "gumta," a small-white caterpillar. The flower is very liable to injury from rain and fog in *Kwár*.

The "bhitná" is frequently attacked by *sunri*, a yellowish caterpillar that destroys the inside.

Area. The area recorded under this crop in the measurement papers is 101,963 acres.

General. The cotton produced by the first flowerings is the best, that of the last flowerings the worst; the staple is brittle, and it is only used for stuffing *razáis*, &c.

When the "bhitná" is ripening (*lent honá*) three or four women will come to the field bringing *dahi*, rice, til-seeds, and a silver ring, pull a few ripe pods and take out the cotton separating the seeds: of the cotton they make garlands, and going to the middle of the field put them on the trees and worship with the other things. The seeds they drop along the road from the field to the house and on the roof of the inner room, to show the road to the cotton, that it may come plentifully.

As a matter of superstition, picking commences on a *Monday* always.

As a good omen, the first pickings are taken to "the shop" and exchanged for sweet stuff for the children, or given to the Brahman or family priest. A good deal of cotton is grown in the raviny land of the Sengar and Jumna.

INDIGO.

(*Kharíf.*)

Name of crop.			Statistics per acre.								
English.	Hindi.	Botanical.	Ploughings.	Time of sowing.	Seed.	Weeding.	Watering	Cutting.	Threshing	*Outturn.* Plant.	*Outturn.* Seed.
Indigo	Nil.	Indigo Fera tinctoria.	2 to 4.	*Chet* March	4 or 5 seers.	Once.	4	16 or 20, men for one day.	1 pair of oxen for 2 days.	50 to 80 maunds or 100 maunds.	5 maunds. or 8 maunds.
Subordinate.											
	Arhrar	...	...	...	4 seers.	...	...	...	...	2 maunds.	5 maunds.
	Andi,	...	...	...	1 „	...	...	...	...	20 seers.	Bhúsa and
	San ...	...	...	...	1 „	...	...	...	...	10 „	stalks.
Varieties.			None.								

Preparation of land.

The field is not manured, but it is best to sow the year after a manured crop like cotton. It must be prepared by watering (*parch*) before ploughing for sowing.

Ploughing, sowing.

The ploughing, sowing, levelling, after sowing and making the irrigation beds, are all done in one day whilst the ground is moist: the cultivator borrows ploughs to help him, and his hired labourers work all day. The seed is sown broadcast and ploughed in, the "mai" being run over afterwards.

Intermediate operations.

The plants show in a fortnight, and must be watered at once, and every fortnight afterwards till the rain falls. When the plant is two finger-joints high (*porua*), and whilst the ground is moist, but not wet, a weeding is given, which must be finished in a day or two at the outside. Old women or children are usually employed in this, and get 1¼ anna and "chabená." Rain (*asárh*) sowings require weeding more than earlier sowings, as the plant whilst still young is liable to be choked by the grass that springs up in the early rains.

Cutting.

For plant (for dye) the indigo should be cut in *Bhádon*, just when the flower bud begins to show; 16 or 20 men will cut an acre in the day. The carriage to the vats is a matter of contract with the factory. The stumps are left for seed, or where there is no indigo factory the whole crop is left for seed, and is cut at the end of November (*Aghan*).

Threshing.

The pods are first separated from the stalks by a man beating a bundle of stalks on the ground, or with a stick, and the seed is threshed out in the usual manner; one pair of oxen taking two days to thresh out the produce of an acre.

Outturn.

Outturn of indigo varies: as much as 100 maunds plant per acre may be cut for the factory, but the cultivator cutting for his own rough manufacture will perhaps cut as little as 50 maunds plant, leaving the stocks for seed, of which he will get five maunds. If he grows for seed alone he may expect eight maunds per acre.

Cost of production.

Indigo (nil) one acre.	Well.	Cost by canal, one lift.	Canal flush.	Produce.	Value.
	Rs. a. p.	Rs. a. p.	Rs. a. p.		Rs. a. p.
Watering (before ploughing)	5 4 0	1 5 0	0 3 0	Plant, 50 maunds at 5 maunds per rupee,	10 0 0
Ploughing and sowing...	0 12 6	0 12 6	0 12 6	Seed, 5 maunds at 6 Rs. per maund,...	30 0 0
Seed	1 10 6	1 10 6	1 10 6	*Arhar* 2 maunds at 1 maund per rupee,	2 0 0
Watering three times ...	15 12 0	3 15 0	0 9 0	Castor-oil seed, 20 seers at 14 seers	
Canal charges ...	...	1 8 0	2 4 0	per rupee ...	1 6 0
Cost of *nándhá* ..	...	0 1 6	...	Hemp, 10 seers ...	1 0 0
Ditto rope and "beri"	..	0 2 6	...	*Arhar* stalks and	
Weeding	2 12 0	2 12 0	2 12 0	bhúsa ...	1 0 0
Cutting plant ...	1 9 0	1 9 0	1 9 0	Indigo stalks, 40 ,,	1 4 0
Ditto seed ...	0 10 0	0 10 0	0 10 0	Castor-oil trees, 8 ,,	0 8 0
Separating seed pods ...	0 10 0	0 10 0	0 10 0		
Threshing	1 13 0	1 13 0	1 13 0		
Winnowing ...	0 5 0	0 5 0	0 5 0	Total produce Rs.	47 2 0
Rent	10 0 0	10 0 0	10 0 0		
Total cost Rs. ...	41 2 0	27 2 0	23 2 0		
Total produce Rs. ..	47 2 0	47 2 0	47 2 0		
Deduct total cost Rs....	41 2 0	27 2 0	23 2 0		
Balance profit Rs. ...	6 0 0	20 0 0	24 0 0		

Price.

The price of plant varies from year to year; of seed it may be said from day to day, being a purely speculative crop: Rs. 20 per 100 maunds plant, the carriage falling on the manufacturer, is a common but low rate, and given in advance chiefly: Rs. 25 to Rs. 27 is got when the ryot carries for himself, or when he sells at his own option as harvest (*khush kharíd*). In one instance so great was the competition between two rival factories for plant that Rs. 32 and even Rs. 40 were given for 100 maunds.

Seed sold in the year of the highest speculation as high as Rs. 42 per maund, but Rs. 6 per maund is about the average price that the cultivator gets.

Uses.

The blue dye we call indigo is obtained from the leaves. The seed is largely exported, Bengal manufacturers finding they obtain the best plant with foreign seed. It is a pity this principle does not obtain more in the North-Western Provinces.

Injuries.

The indigo plant is subject to no danger from insects. Cattle will not eat it, though they graze on the grass amongst it. It suffers quickly from want of water in the hot winds.

Area.

The area recorded under this crop in the measurement papers is 24,083 acres.

General.

Before cutting indigo " púja" is performed by taking a male goat with *ghee*, rice, *gur* or *dhúp* (incense) and water to a corner of the field. The goat (whose head must not look towards the south, is then worshipped with the other things and killed with a chopper (*garási*) if the owner eats flesh; if not, cut in the ear and let go, when it becomes the property of *fakírs:* or a corner tree is worshipped with "dhúp" and a few sweetmeats which will afterwards be distributed to friends.

RICE.

(Kharíf.)

Name of crop.			Statistics per acre.									
English.	Hindi.	Botanical.	Ploughings.	Time of sowing.	Seed.	Weeding.	Watering.	Cutting.	Threshing.	Outturn.		
										Rice.	Bhúsa.	
										Maunds.		
Rice	*Dhán*	Oryza sativum.	2 to 4	*Asárh*	Re. 1 worth of seed or 5 Rs. worth of seedlings.	Once.	3 times,	Coarse in *Bhádon*, fine in *Aghan*.	See below.	8 to 16.	30 maunds.	

Varieties.

The varieties are numerous, but the broad distinction is into "sown broadcast" and "transplanted" (*ropa.*)

1. The coarse black rice called "mungi," "kaliá" or *sáṭhi* (because it ripens in 60 days) is sown broadcast.

2. The following are transplanted rices in order of quality :—

a. *Kamod.*

b. *Bánsmatti.*

c. *Sudarshaná.*

d. *Náhá*, has graceful feathery fronds drooping, with red or white beard, seed is elliptic, and the seeds overlap alternately.

e. *Seondhi*, short red beard, seeds rather like those of *náhá.*

f. *Sumhara*, is coarse, red sheathed, with erect fronds, seed almost round. White *sumhara* is called *bindhia.*

g. *Shakarchíní.*

h. *Dudhiá.*

i. *Motia, Bhuteya, Talwánsi, Subia, Gajra,* coarse red kinds, with very round and thick seed.

Other names are given, but the above are the varieties most commonly met with: in fact we may summarise the rices prevalent in the district as 1 *Mungi*, 2 *Seondhi*, 3 *Sumhara.*

Preparation of land.

All rices require a strong soil and plenty of (regulated) water. It is on this point both quality and quantity depend. In extensive rice swamps the water is regulated by an embankment, and the depth to which the plant is covered is carefully watched.

Ploughing.

The field is ploughed twice for *mungi*, four times for better rices, and then a harrow "ghan" or "patelá" with pegs in it, is run over it to collect the grass.

Sowing.

The coarse rice is simply sown broadcast, the finer sorts are sown in small seed-beds (*ber*) in *Asárh*, and transplanted in *Sáwan:* the seedlings cost as much as Rs. 5, enough for an acre. Transplanting takes five days and costs Rs. 4.

Intermediate operations.

Coarse rice is weeded once where it grows: it is not irrigated, being cut before the rains cease. The transplanted rice is watered when the rains cease till cut, that is, from *Kwár* (end of September) to *Aghan* (middle of November), as often as four times; where canal water is available it is largely used, but ordinarily the water of the adjacent pond or lake is used. The cost increases as the water has to be lifted higher as the pond dries up. Weeding rice is hard work and highly paid, and as far as possible the ryot does it himself.

Harvest.

The black rice is cut in *Bhádon*, the transplanted rice in *Aghan;* eight men can cut an acre in a day, and bring the sheaves to the threshingfloor. The reaper often also beats out the grain, getting from one-twelfth to one-sixteenth of the produce.

Threshing.

The better rices are threshed in the usual way. In an experiment made by me it took six oxen driven by two men, and helped by four other men, a day to thresh out the produce of half acre *sumhara*. In the same experiment it took six men half a day to winnow the grain. But the grain is only separated from the stalk; it remains in the husk, from which it is subsequently separated in an "okhli" (large mortar) by a "músal" (pestle).

Outturn.

The estimated outturn is much undervalued. The following experiments I have made give to the acre:—

Sudarsana only	4 maunds	21 seers.		
Subra	8	„	5	„
Talwánsi	10	„	24	„
Sumhara	16	„	+ 30 maunds bhúsa.	

All these fields were watered, most of them three times.

I do not think under favourable circumstances less than 16 maunds should be looked for; less will not pay the cultivator after irrigating.

Of *mungi* four maunds will pay, for this crop costs little to rear, and is off the ground in time to allow of a crop of gram, peas, or *bijhra*.

The above estimates are in unhusked rice (*dhán*), in which we have the proportion of four seers "cháwal" to one seer "bhúsi."

Uses.

The coarser sorts are purchased by the *bhurji* and sold as "khíl;" less coarse sorts are made into flour; the finer sorts are sold for the table. Rice when cooked is called *bhát*. Rice is constantly used also in sweetmeats.

The husk is much used for mixing with mud and cowdung for plastering walls. The straw is of no use for fodder, cattle will not eat it; hence it is generally used as bedding.

Cost of production.

Rice (*sunhara*) one acre.	Other sources.	Cost by canal, one lift.	Canal flush.	Produce.	Value.
	Rs a. p.	Rs. a. p.	Rs. a. p		Rs. a. p.
Ploughing	1 4 0	1 4 0	1 4 0	Rice or "dhán," 16 maunds at 32 seers per rupee.	20 0 0
Seed	2 0 0	2 0 0	2 0 0	*Payár* or straw, 30 maunds...	4 0 0
Sowing	3 14 0	3 14 0	3 14 0		
Watering	5 0 0	5 4 0	0 12 0		
Cost of *nándhá* ...	0 1 6	0 1 6	0 0 0		
Do. rope and "beri"...	0 2 6	0 2 6	0 0 0	Total produce Rs. ...	24 0 0
Canal charges ...	0 0 0	3 5 4	5 0 0		
Cutting	0 12 0	0 12 0	0 12 0		
Threshing'... ...	1 3 0	1 3 0	1 3 0		
Winnowing ...	0 6 0	0 6 0	0 6 0		
Rent	4 0 0	4 0 0	4 0 0		
Total cost Rs. ...	18 11 0	22 4 4	19 3 0		
	Rs. a. p.	Rs. a. p.	Rs. a. p.		
Total produce ...	24 0 0	24 0 0	24 0 0		
Deduct total cost ...	18 11 0	22 4 4	19 3 0		
Balance profit ...	5 5 0	1 11 8	4 13 0		

Injuries.

The only danger besides that of drought is from the ravages of a small green fly (*gandhuki*) which attacks those rices of which the fronds come out of the leaves. Walking through a rice field, one may put up myriads of these flies. Pigs destroy rice, but will not touch bearded sorts.

Area.

The area recorded under this crop in the measurement papers is 27,143 acres.

General.

The same portions *(hakk)* are taken from the threshingfloor as described in wheat.

In pargana Sikandra it is very common to sow rice and *jwár* together; if heavy rain destroys the *jwár*, the rice gives a salvage crop.

INDIAN-CORN OR MAIZE.

(Kharíf.)

NAME OF CROP.			STATISTICS PER ACRE.								
English.	Hindi.	Botanical.	Ploughings.	Time of sowing.	Seed.	Weeding.	Reaping.	Threshing	Winnowing.	*Outturn.* Grain.	*Outturn.* Fodder
Primary.											
Indian-corn.	*Makka* or *makai.*	Zea mais.	2 or 3	Asárh,	5 seers,	Twice—1st time 16 men. 2nd time 12 men.	4 men for two days.	1 pair of oxen for 2 days.		8 to 16 maunds.	None.
Subordinate.											
	Kákún				½ seer.					2 maunds	
	Kakrí				½ seer.					2 Rs. worth.	
	Urd.									1 maund.	
	Jwár ...										

Varieties. None.

Preparation of land manure. Is generally sown in home lands, and manured with about 80 maunds to the acre.

Ploughing. The land is ploughed at least twice.

Sowing. Takes rather long to sow, as each grain is separately planted on the ridges; hence a man is generally hired to help. The ground when sown is levelled by the "patelá." The *kákun* is sown mixed with earth broadcast.

Intermediate operations. Maize must be weeded at least twice, the first time taking longer than the second; and the stalks are strengthened by earth heaped up round the roots with the "pháorá." It is watched for about a fortnight.

Harvest. It is ripe in *Bhádon*, and the trees are first cut down and stacked, the cobs separated from the stalk and spread out to dry, when the grain can either be rubbed off with the fingers or threshed out in the usual way. The cutter often gets one-twentieth share in lieu of wages.

Outturn. Sixteen maunds an acre may be considered a full crop, as the crop is nearly always grown in the best lands.

Uses. The grain is eaten either ground and made into bread, or whole as porridge, or parched.

The stalks are useless for fodder, no cattle will touch them they are so hard (very rarely they are given mixed up in a lot of chopped green food); nor are they thrown on the manure heap, as they breed white-ants; hence they may nearly always be seen lying near the field where they grew.

Cost of production.

"Makái," Indian-corn, one acre.	Well.	Cost by canal, one lift.	Canal flush.	Produce.	Value.
	Rs. a. p.				Rs. a. p.
Manure	2 0 6			Indian-corn or *makái*, 16 mds. @ 1 Re. per maund ...	16 0 0
Ploughing	0 10 0			*Kákun*, 2 maunds ...	2 0 0
Do. and sowing ...	0 13 0			*Jwár*, 1 maund (round the edge)	1 0 0
Seed	0 5 0			*Kahri*	2 0 0
Weeding twice ...	3 12 0				
Watching (proportional share)	1 4 0			Total produce Rs. ...	21 0 0
Cutting	0 5 0			Deduct total cost Rs. ...	20 5 0
Do. heads (*bhutta*) ...	0 5 0				
Threshing	0 14 6				
Rent	10 0 0			Balance profit Rs. ...	0 11 0
Total cost Rs. ...	20 5 0				
After Indian-corn, *Bijhra* (double crop).					
Ploughing	2 8 0	2 8 0	2 8 0	*Bijhra*, 12 maunds @ 32 seers per rupee	15 0 0
Cleaning	0 10 0	0 10 0	0 10 0	*Sarson*, 2 maunds @ 13½ seers per rupee	6 0 0
Ploughing and sowing ...	0 12 6	0 12 6	0 12 6	*Seohan*, 20 seers	1 0 0
Seed	2 9 6	2 9 6	2 9 6	*Lahi*, 10 seers @ 16 seers per rupee	0 10 0
Watering twice ...	10 8 0	2 10 0	0 6 0	*Bhúsa*, 26 maunds @ 4 mds. per rupee	6 8 0
Canal charges ...	0 0 0	1 8 0	2 4 0		
Cost of nándha ...	0 0 0	0 1 6	0 0 0	Total produce Rs. ...	29 2 0
Do. rope and beri ...	0 0 0	0 2 6	0 0 0		
Cutting	0 12 0	0 12 0	0 12 0		
Threshing	1 2 0	1 2 0	1 2 0		
Winnowing	0 6 0	0 6 0	0 6 0		
Total cost Rs. ...	19 4 0	13 2 0	11 6 0		
Total produce Rs. ...	29 2 0	29 2 0	29 2 0		
Deduct cost Rs. ...	19 4 0	13 2 0	11 6 0		
Balance profit Rs. ...	9 14 0	16 0 0	17 12 0		

Injuries. Porcupines are very fond of the young cobs and cut down the trees to get at them.

The young cob is also liable to attacks of a green insect.

Area. The area under Indian-corn, as shown in the settlement papers, is 24,085 acres, but this is much below the mark, because the crop being off the ground before the measurement staff began work, and its place taken by another crop, much must have been omitted.

SMALL MILLETS.

Name of crop.			Statistics per acre.						
English.	Hindi.	Botanical.	Ploughing.	When sown.	Seed.	Weeded.	When cut.	*Outturn.* Grain.	*Outturn.* Price per rupee.
Small Millets.	*Kákun* (*Kangni*)	Panicum Italicum ...	2 or 3	August (*Sáwan.*)	¼ seer	Twice ...	October...	3 maunds	34 to 30 seers per rupee.
	Sánwán ...	Panicum miliaceum ...	2 or 3	August ...	½ seer	Once ...	October..	½ maund with *jwár*	do.
	Marua (*Rági*) ...	Cynosurus Corocanus ..	2						do.
	Chenwa ...	Panicum frumentaceum?	2	March ..	4 seers	Never ..	May ...	4 maunds	do.
	Kodo ...	Paspelum frumentaceum	with cotton.	with cotton.	½ seer	with cotton.	November	½ maund	25 to 30 seers.

These small millets do not form a large proportion of the food crops of the district, but are grown in sufficient quantities to warrant notice. Statistics are given above.

Kákun. *Kákun* is sown in gauhán lands, and the ground is manured. The head is pulled from the stalks by the hand, the tree is not cut; the green stalks are given as fodder; what is left goes into the manure pit. A second crop is always grown after *kákun* is cut.

Sánwán. *Sánwán* is sown alone in a similar manner, but often (in the Jumna parganas) with *jwár*, before which it is cut. By being sown with so tall a crop it escapes the ravages of birds and insects. Its leaves too are rough (*kharkhara*), and an insect if it crawls on them sticks, and cannot progress; hence *jwár* too benefits by the *sánwán* entrapping the "agia." When cut it is stacked to ferment (*dandak*), by which the seed is more easily separated from the ear; it is then threshed out with sticks. Four men will thresh and winnow out in a day the produce of *Sánwán* sown with other crops. There are two kinds, "lál" and "maila," the latter being the better. *Sánwán* is looked upon quite as an extra, and not usually sold, but consumed in the house in the shape of bread, or as rice (*bhát*); partridges and quail too are fed on it and *kangni*. Being, when sown alone, cut by October, it is always followed by a second crop.

Chena or *chenwa* is very little grown in this district; it takes a great deal of watering, as one day's "hot wind" (*láh*) may kill it, or scatter the grain, if any, from the ear. The stalks are of no use as fodder, but are thrown on the manure heap or used as bedding.

Kodo can be grown in any kind of soil, and is always sown with other crops, chiefly cotton, in which it has room and light ; it suffers much from the "agia." As its ears lie hid in the leaves it escapes the ravages of birds. It requires much weeding. It is cut in November, tree and all, and lies a week to ferment, after which it is still difficult to beat out, and it will take twice as many men as *Sánwán* to thresh and winnow. The straw is not used for manure, but is valuable for bedding, being soft and warm. The seed is eaten as rice, and is considered good for ague : it is eaten too by *Kurmis* with buttermilk.

Maṛuá is little grown in this district ; its treatment is that of *chena*.

PULSES.

Name of crop.			Statistics per acre.							Outturn.	
English.	Hindi.	Botanical.	Seed.							Grain.	Bhúsa.
Pulses...	*Arhar.*	Cytisus cajan									
	Múng.	Phaseolus mungo	½ seer	with	prima	ry cro	ps.				
	Urd.	Dolichos Pilosus ?	1 seer								
	Moṭh.										
	Masúr.	Ervum hirsutum ?		Rarely	grown	in the	distric	t.			

These leguminous plants are sown mixed with the principal kharíf crops, *jwár* and *bájrá*, but *moṭh* is generally confined to *bájrá*, and rarely, if ever, sown with *jwár*; it is often also sown alone. *Urd* is also sown with cotton (q.v.) and maize. The seed is mixed with that of *jwár* and *bájra*, and sown at the same time: urd being sown a little later in cotton, *i.e.*, when the latter promises to be a poor crop: the treatment is the same as described under those heads. Excepting *arhar* the pulses ripen before the primary crop, and are gathered, threshed, and winnowed separately: *arhar* is cut with the rabi crop, threshed and winnowed with them. *Moṭh* is grown alone on poor sandy soils.

The grain is principally used as "dál," a general term for the pulse which natives almost universally eat with their bread in the form of a pea-soup. *Moṭh* is given to horses as a mash or as a substitute for gram when this is dear, but is an excessively fattening food and to be avoided; as a substitute for grain maize is preferable if procurable.

The chaff of these pulses is excellent food for cattle mixed with other "bhúsa;" the stalks of the small pulses are hard and are not given as food, but burnt. The stalks of *arhar* are most useful for making binders for wells (for which they fetch 1 anna per bundle) and for roofing purposes and for baskets. The grass which is found amongst moṭh is valuable for fodder.

These subordinate crops (called sometimes "ganjar") are valuable helps to the ryot in paying his rent, the whole of which often is provided by them. Their outturn, however, depends entirely on the success of the primary crop. If that is good, the subordinate crops yield less, so that they are more to be looked upon as an alternative or an extra crop than as a principal rent-paying one.

Area.

The area recorded under these crops in the measurement papers is 8,015 acres, separately sown.

General.

A variety of *urd* is sown in February or March in low damp ground; this is harvested in *Jeth*, and hence is called *jethua urd*. *Urd* is sown alone too in *már* and *kábar* soils, as is *masúr*. Of all the pulses *urd* is the most esteemed and kept for marriages and feasts; next *arhar*; least of all *moṭh*.

Urd and *múng* are not sown in the same field; *urd* is sown in *dumat* soil, *múng* in lighter sandy soil.

PEA.

(Rabi.)

Name of crop.			Statistics per acre.								
English.	Hindi.	Botanical.	Ploughings.	Time of sowing.	Seed.	Watering.	Reaping.	Threshing.	Winnowing.	*Outturn.* Matar.	*Outturn.* Bhúsa.
ea	*Matar.*	Pisum sativum.	3 to 9	*Aghan* or end of November.	30 seers to 1½ maund.	Once.	In *Chait* by 10 men.	1 yoke of oxen in a day.	2 men in one day.	8 Mds.	20 Mds.
	Subordinate, Alsi.				2 seers.					25 seers	

White, "kapilia" (kabilia vulgo), sown alone. Black sown mixed with barley, and not referred to below.

Varieties.

Manure. None.

The white pea is generally sown after indigo has been cut, or in *tarái* when the water has cleared off. There is no time therefore to give more than two or three ploughings, but where sown separately it gets the usual number of rabi ploughings, as in one experiment it had.

Ploughings.

Sowing. It is sown broadcast and harrowed in.

It is sometimes weeded once (in an experiment it took twenty men to weed the acre in the day) and watered once; but is more often grown unirrigated.

Intermediate operations.

It is harvested just as other rabi crops, but takes less time to thresh, the seeds coming out of the pods easily.

Harvest.

My experiments do not give above four maunds the acre; but this seems to me a light crop.

Outturn.

Uses. The pea is often eaten raw, or the pod is parched and eaten; it is usually given a browning in *ghee* and called "nimona" or eaten as *dál*.

Price. This pea used to sell at 40 seers the rupee.

Cost of production.

Pea (*matar*) one acre.		Cost. Rs.	a.	p.	Produce.	Value. Rs.	a.	p.
Ploughing, four times	...	2	8	0	Pea (*matar*), 8 maunds at 1 maund per rupee.	8	0	0
Ditto and sowing	...	0	13	0				
Seed, 1½ maund	...	2	3	0	*Alsi*, 25 seers at 12½ seers per rupee.	2	0	0
Cutting	...	0	8	0				
Threshing	...	1	0	0	*Bhúsa*, 20 maunds at 4 maunds per rupee.	5	0	0
Winnowing	...	0	4	0				
Rent	...	6	0	0	Total produce ...	15	0	0
					Deduct total cost ...	13	4	0
Total cost	...	13	4	0	Balance profit ...	1	12	0

Injuries.

It is liable, like gram, to an insect (*bahédura*) which attacks the unripe pod (*ghenṭi*) and also to frost.

Area.

The area recorded under this crop in the measurement papers is 5,200 acres.

General.

This pea is essentially a make-shift crop. The seed is said to have originally come into this district in some *bijhra* from across the Ganges or from the west (the two quarters from which everything new is said to come), and to have been selected and come into fashion as a separate crop, especially as the size of the pea overweighted the *bijhra*.

CASTOR-OIL PLANT.

Name of crop.			*Statistics per acre.*
English.	Hindi.	Botanical.	
Primary.			
Castor-oil plant.	*Andi*	Palma Christi.	Sown with other kharif crops, cut with rabi.
Subordinate.			
Beans	*Sem*	Phaseolus mag nus.	

Varieties. None.

Preparation of land. As it requires good rich soil it is usually sown round or in cane and cotton fields, though in the alluvial lands of the Jumna it is often sown in an entire field, but very scattered; *bájra* being intermixed in kharíf or mustard in rabi.

Sowing. The seeds are sown separately by hand and a little manure put over every seed. It is a common custom to plant the tree on the walls of new groves, &c.; the root stands high, and free from moisture.

Intermediate operations. The plant is often earthed up to strengthen it. Beans are planted between the trees, on which they are afterwards trained.

Harvest. The tree is cut down, the pods taken off and buried in a hole covered with earth to destroy the husk. Cultivator generally only plants enough to keep himself in oil.

Outturn. The beans are worth 8 annas to Re. 1 an acre.

Uses. The seed is crushed by the "bhurji" *(not teli)* for oil, who uses the refuse ("lugdi") for fuel. The leaves are a common green food for cattle. The longer and straighter stalks (*koro*) are used for thatching, the crooked ones are burnt.

Manufacturing processes. The *bhurji* crushes the seed in a *kundi* or wooden mortar, and then boils over a quick fire, when the oil floats to the surface and the refuse sinks to the bottom. The *bhurji* gives one-third of gross weight in oil to cultivator (see *til*).

HEMP.

Name of crop.			Statistics per acre.							
English.	Hindi.	Botanical.	Ploughings.	Time of sowing.	Seed.	Weeding.	Cutting.	Peeling	Outturn. San.	Outturn. Price.
Hemp.	*San.*	Crotolaria juncea.	Once	*Asárh Sáwan*	2 mds	None	20 men	70 men will peel an acre's outturn of hemp in a day.	10 mds.	10 seers per rupee.

Varieties. None.

Preparation of soil. Hemp requires a light good soil. Stiff clay gives a short stalk, and hemp is not sown in it. In better soils hemp is sown in rows round fields of cotton or jwár; in light soils it is sown thick, unmanured.

Ploughing. One ploughing is enough.

Sowing. Seed is sown broadcast and ploughed in.

Intermediate operations. None.

Harvest, cutting, &c. At beginning of *Kátik* the heads are cut and given to cattle, and the plant is cut a few inches above the ground and tied into bundles which are stood up in ponds (the lower part of the stem is thicker than above; if the bundle were at once laid down this part would rot later). Green hemp, if not exposed to wet, will keep for several days before being soaked. In hot weather it takes about four or five days to rot, and six or seven days in cold weather. For this it is laid down flat in the water and kept down by earth dug from the pond itself. About the fourth or fifth day it is tested.

Threshing. The fibre is threshed out of the stalks by men holding handfuls at a time. It is severe labour, hence a man can only work three hours at a time, in which time he will thresh out five bundles, each bundle being 50 or 60 lbs., giving only 3 lbs. fibre per bundle, or in all 15 lbs. The stalks when white with fibre are stood up to dry in a stack (*kondar*). The whole process must be gone through in one day or the fibre knots and breaks. When threshing it is usual to strip a few inches of the stalk clean, so that the fibre peels off easily.

N.B.—If cut for fibre, it is cut when it flowers; if for seed, when they ripen in Aghan.

If sown round a field of an acre square the yield will be ten bundles or 30 seers fibre. In a whole field about ten maunds; ten maunds of seed per acre are also got.

Outturn.

Uses. The fibre is used for ropes. The seeds are boiled and given as food to cattle. The stalks are burnt.

Price. About ten seers the rupee.

Area. The area recorded under this crop in the measurement papers is 1,469 acres.

Hemp, one acre.	Cost.			Produce.	Value.		
	Rs.	a.	p.		Rs.	a.	p.
Ploughing ...	1	4	0	Hemp, ten maunds at Rs. 4 per maund.	40	0	0
Seed, 2 maunds ...	5	0	0				
Cutting ...	1	8	0	Deduct total cost ...	21	15	0
Bundles of plant for standing in the pond.	0	12	0	Balance of profit ...	19	1	0
Cleaning, &c. ...	1	11	0				
Peeling ...	3	12	0				
Rent ...	8	0	0				
Total cost ...	21	15	0				

General. A bundle of fibre is called "*lachhe.*" If short stalks remain in fibre it is called *anjhá* (tangled). If then cleaned it is called *tilohrá.*

Name of crop.		
English.	Hindi.	Botanical.
Hemp	*Patsan* or *Latia*	Hibiscus cannabinus or corchorus capsularis (Elliott).

Patsan is sown round cotton, cane, or indigo fields, never thick. Its fibre is not threshed but rubbed out with the hand, and takes longer to separate than that of "san." It comes clean off the stalks, and is called *tilohra.*

If sown round an acre will give 50 bundles of plant, each bundle giving 2½ seers fibre. Fibre is best nearest the ground, to which the plant is cut close. Its price is 12 seers the rupee.

The fibre is coarse and dark, but good for well ropes and gunny bags.

WHEAT.

(Rabi.)

Name of crop.			Statistics per acre.								
English.	Hindi.	Botanical.	Ploughings.	Time of sowing.	Seed.	Watering.	Reaping.	Threshing.	Winnowing.	Outturn. Grain.	Outturn. Fodder.
Pri	*mary.*				M. s. c.					Maunds	
Wheat	*Gehun*	Triticum Sativum.	8 to 12	*Kátik*	1 20 0	3 or 4	12 men will reap an acre in a day.	4 oxen in 6 days.	4 men one day.	8 to 16	24 mds.
Subor	*dina.e.*										
Mustard.	*Sarson*				0 1 0					3 mds.	
Rape	*Lahi*				0 1 0					1½ do.	
	Dudn or *Seohán.*										
Safflower	*Kusam.*				0 1 0					16 seers	

Varieties.

1. *Dudya*, white beardless. Full-grain soft husk, thick stalk, clean white flour (commonly called *seta*).

2. *Mundya*, beardless, rarely sown, chaff hard.

3. *Manneya*, bearded, reddish grain, amount of chaff above average, short stalk.

4. *Pisiya*, small tree, few grains, but a larger grain than *kathiya*, sweet flour, but gets heavy (*aintha*) when cold. Very liable to rust.

5. *Kathiya*, red bearded, thick stalk and grain, many stalks to one plant. Flour very digestible.

Land, manure, &c.

The best land in the village is usually chosen, especially for *dudya*. Loam preferred if manure not heavy, but well manured sandy soil equally good as well manured loam. Manure seldom put on specially for wheat, which generally follows cane or cotton, for which the land has been well manured. *Kathiya* is sown unmanured in *már* soils. *Pisiya* is sown in the *kachhár* lands (hence liability to rust and frost-bite, the ground being cold and wet).

Ploughing.

As a rule, eight to twelve ploughings are required, followed each time by a harrowing. *Manneya* requires less ploughing, and for *kathiya* the *már* soil is ploughed twice only, but with the "bakhar."

Sowing.

Wheat is sown after 15th October (*swáti nichattar*). It is sown through a "báns" attached to the plough, the seed of *sarson* being mixed with the wheat. The field is then harrowed. The other subordinate crops are sown in lines eight feet apart. Two men and a yoke of oxen can sow and harrow a field of an acre in two days.

Wheat is always irrigated, except in the Jumna parganas. Irrigation beds and channels are made by twelve men in a day. The wheat must be watered when eight inches high (or the ends of the leaves turn yellow and white-ants attack it), and is generally watered two or three times more. It is sometimes, but not always, weeded once ; sixteen men can weed an acre in a day.

Intermediate operations.

The crops are cut separately with the sickle (*hasya*), the reapers getting one-twentieth in kind for wages ; but for this the sheaves are also carried to the threshingfloor, where it is generally protected by the *arhar* being heaped round it, the cut stalks outwards. The reaper generally manages that his sheaf[1] (*dáb*) shall be larger than the others. A reaper can earn about three sheaves up to noon, after which he will carry to the threshingfloor. Three or four oxen tied together tread out the grain, driven by a man behind. They will take six days to thoroughly thresh out an acre's growth of wheat.

Harvest reaping.

Threshing.

One man lifts the mixed grain and chaff in a basket and slowly pours it out, so that the wind (which is generally blowing hard from the west at this time, but if not, must be artificially created by two men waving a blanket or *dhoti*) separates the chaff from the grain, another man heaps up the grain as it falls. This process is repeated and the clean grain heaped up.

Winnowing.

Heap unthreshed	...	...	...	*Marni.*
,, threshed, not winnowed	...	...	...	*Saiṛh* or *kundi.*
,, winnowed once	...	...	...	*Sili.*
,, of clean grain	...	...	...	*Rás.*

Average outturn per acre.

Eight maunds for the dry sorts. Sixteen maunds for the best sorts sown in the best land.

Area.

The area recorded under this crop in the measurement papers is 52,618 acres.

Uses.

Much wheat is exported, especially the white or mixed white and red. As a rule, the better class folk eat it as bread.

The chaff (*bhúsa*) of wheat is hard and slippery, and sticks to the palate. It is not liked by itself, but is of course used mixed with chaff of other crops. The *bhúsa* of *kaṭhiya* is said to prevent wind in horses.

Price.

The price of "manneya" is a seer in the rupee less than other sorts. *Kaṭhiya* and *pisiya* again are cheaper than *seta* (*sufaida* or white "dudiya" wheat). The price has varied too much of late to make it worth while making any statement here.

[1] Each sheaf contains about 2½ seers grain.

Cost of production.

Wheat, one acre.	Well.			Cost by canal one lift.			Canal flush.			Produce.			
	Rs.	a.	p.	Rs.	a.	p.	Rs.	a.	p.		Rs.	a.	p.
Ploughing, 10 times,	6	4	0	6	4	0	6	4	0				
Sowing	0	11	6	0	11	6	0	11	6				
Seed, 1¼ maund ...	2	5	0	2	5	0	2	5	0	Wheat, 16 maunds at 20 seers per rupee.	32	0	0
Clodcrushing ...	0	5	0	0	5	0	0	5	0				
Making irrigation beds.	0	3	0	0	3	0	0	3	0	*Sarson*, 3 maunds at 13¼ seersper rupee.	9	0	0
Watering ...	17	8	0	3	15	0	0	9	0	*Bhúsa*, 24 maunds at 4 maunds per rupee.	6	0	0
Canal charges ...		...		1	8	0	2	4	0				
Cost of *nándiá* ...		...		0	1	6		...		*Kusam*, 16 seers at 4 seers per rupee.	4	0	0
„ rope and "beri",		..		0	2	6		...					
Weeding ...	0	12	0	0	12	0	0	12	0	*Lábi*, 1 maund and 20 seers at 16 seers per rupee.	3	12	0
Cutting ...	1	0	0	1	0	0	1	0	0				
Threshing ...	0	15	0	0	15	0	0	15	0				
Winnowing ...	0	6	0	0	6	0	0	6	0	Total produce Rs. ...	54	12	0
Rent	8	0	0	8	0	0	8	0	0				
Total cost Rs. ...	38	5	6	26	8	6	23	10	6				
Total produce Rs.	54	12	0	54	12	0	54	12	0				
Deduct cost Rs. ...	38	5	6	26	8	6	23	10	6				
Balance profit Rs.	16	7	6	28	4	6	31	2	6				

Injuries.

Wheat is liable to be blown down when ripening. It is subject to ravages of —

Girwi, rust,

Lassí, blight (a small louse-like insect),

Lákhá,

which are nearly always brought by moisture and east wind, disappearing when the dry west wind blows again.

General.

I may here enumerate the various demands on the cultivator's grain before he touches it himself (to speak strictly, it is usual for the ryot to cut all his fields, leaving one from which he satisfies all his "tahluas") :—

Per heap of grain (rás)

Faktr	¼ seer
Family priest	¼ „
Parohit or *Bhát*	¼ „
Máli (who supplies flowers for worship of Debi) ...	½ „
	2 „
Chamár for cleaning threshingfloor, per heap one *dáb*, besides the gleaning that is left on the floor, about two seers	1/20 „

Per plough.

Blacksmith (also ¾ seer first day of ploughing for sowing),	10 „
Carpenter	10 „

Per holding.

Washerman (+¼ seer for each piece washed) 2 *dábs* or...	2½ „
Barber (+¼ seer for each shave) 2 dábs or ...	5 „
Potter	10 „
Gorait or watchman, 2 dábs or	1¼ „

Note.—A dáb represents what a reaper can cut without moving. Hence its weight in grain varies according to the thickness of the crop. Workmen too get a larger allowance than recipients of charity.

BARLEY.

Name of crop.			Statistics per acre.								
English.	Hindi.	Botanical.	Ploughing.	Seed.	Time of sowing.	Watered.	Reaping.	Threshing.	Winnowing.	*Outturn.* Grain.	*Outturn.* Fodder.
Primary.				M. s. c.							
Barley.	*Jau* ...	Hordeum vulgare	8 to 12	1 20 0	*Kátik*	Twice	V.S.	3 pair of oxen working 3 at a time.	4 men	8 to 16 mds.	28 mds.
Subordinate.											
	Sarson			1 8 0						4 0 0	
	Lákhi										
	Dudn										
	Kusam										
	Alsi ...			0 1 0						0 20 0	

Varieties.

None, but it is in this district rarely sown alone, but sometimes with wheat, when it is called "gojai," sometimes with gram, when it is called *jauchana*, or gram and peas (*matar*), vetches (*chitara*), when it is called *bijhra*. Rarely barley alone is called *bejhar*.

Preparation of land.

Not often specially manured, but frequently follows manured crops, *e.g.*, maize or cotton, when this fails. It is very commonly sown after indigo.

Sowing.

Is sown through a *báns* attached to plough. Two men with a yoke of oxen take two days to sow and harrow an acre of barley. A less weight of pulse is sown than of barley.

Intermediate operations.

Barley or *bijhra* is more frequently left dry than watered, unless *canal* water is in abundance. It is not often weeded, and never more than once.

Harvest.

The entire operations are the same as for wheat.

Outturn.

Sixteen maunds is a good outturn, and considering that this is a crop sown in all lands, good and bad, too high an estimate must not be made. For dry outlands four or five maunds to the acre is a very fair crop.

Uses.

Are the same as wheat, but the mixed crops are largely eaten by the middle and poorer classes, who sell their wheat.

Cost of production.

Bijhra, one acre.	Well.			Cost by canal, one lift.			Canal flush.			Produce.	Value.		
	Rs.	a.	p.	Rs.	a.	p	Rs.	a.	p		Rs.	a.	p.
Ploughing six times ...	3	12	0	3	12	0	3	12	0	*Bijhra*, 16 mds. at 32 seers			
Ditto and sowing...	0	13	0	0	13	0	0	13	0	per rupee	20	0	0
Seed 1½ maund... ...	2	9	0	2	9	0	2	9	0	*Sarson*, 3 mds. at 13½			
Cloderushing	0	5	0	0	5	0	0	5	0	seers per rupee ...	9	0	0
Making irrigation beds..	0	3	0	0	3	0	0	3	0	*Lâhi*, 1 md. at 16 seers			
Watering twice ...	11	0	0	2	10	0	0	6	0	per rupee	2	8	0
Canal charges ...	0	0	0	1	8	0	2	4	0	*Alsi*, 20 seers at 14 seers			
Cost of *nándhá* ...	0	0	0	0	1	6	0	0	0	per rupee	1	8	0
Ditto rope and "beri"	0	0	0	0	2	6	0	0	0	*Bhúsa*, 28 mds. at 4 mds.			
Cutting	1	0	0	1	0	0	1	0	0	per rupee	7	0	0
Threshing	0	15	0	0	15	0	0	15	0				
Winnowing	0	6	0	0	6	0	0	6	0	Total produce Rs. ...	40	0	0
Rent	7	0	0	7	0	0	7	0	0				
Total cost Rs. ...	27	15	0	21	5	0	19	9	0				
Total produce Rs.	40	0	0	40	0	0	40	0	0				
Deduct cost ...	27	15	0	21	5	0	19	9	0				
Balance Profit Rs. ...	12	1	0	18	11	0	20	7	0				

Injuries.

Barley and *bijhra* are liable to attacks of *lassi* and *girwi* (see wheat), but rust attacks barley much more rarely than it does wheat.

Area.

The area recorded under this crop in the measurement papers is 325,913 acres.

General.

In the Ganges parganas the subordinate crops are generally of the mustard class; but in the southern parganas *kusam* is frequently sown, and in poor fields, where the pulse predominates over the cereal, flax is commonly sown.

The object of the cultivator in mixing cereals and pulses is first that dew readily forms on the leaves of the *chana*, which would not form on the wheat, and in seasons of drought the practice is often the means of preserving both crops (Elliott's Glossary): and, secondly, that cereals and pulses are not liable to the same injuries; one or the other is sure to thrive if the other suffers, *e.g.*, damp will cause rust in the wheat, but the gram escapes; frost will kill the gram, but the wheat escapes.

Gojai is a common crop in dry sandy soils.

GRAM.

Name of crop.			Statistics per acre.								
English.	Hindi.	Botanical.	Ploughing.	Time of sowing.	Seed.	Watering.	Reaping.	Threshing.	Winnowing.	Outturn. Grain.	Outturn. Bhûsa.
Primary.					M. s. c.					M. s. c.	
Gram.	*Channa*	Cicer arietinum.	6 or 7	November.	1 10 0	Dry	Cut in *Cheit* by 12 men to the acre.	1 yoke of oxen in 2 days.	8 men	10 0 0	12 mds.
Subordinate.											
	Sarson.				1 seer					1 mds.	
	Lahi.										
	Dudn.										
	Alsi.										

Varieties. None.

Preparation of land manure. Gram is either sown in strong clay, when it grows thick and like a carpet, or in light sandy soils. In the former instance it is a sign of good soil of its kind, in the latter of poverty of soil. It is often sown in *tarái* lands.

Ploughings. The land is ploughed as often as opportunity offers, but being generally considered only a third rate crop, it gets less care than wheat and *bijhra*. In *tarái* lands it of course only gets such ploughings as there is time for after the water clears off.

Sowings. It is sown in the usual way, the mustard being either sown in rows or mixed up: the flax always in rows.

Intermediate operations. It is not watered, and rarely weeded.

Harvest. It is cut, threshed, and winnowed in the usual way.

Outturn. This varies much. On the poor sandy soils three maunds is a good outturn; in the stiff clays ten maunds is not too high an estimate.

Uses. Gram is principally used as horses' food, but is also used for bread, as pulse (*dál*) made into sweetmeats, or parched (*chabena*): in this form it is constantly given to labourers as part of their hire. It is a common *viaticum*. The *bhúsa* is excellent for cattle, but is too good to be used alone, and is mixed with the chaff of cereals.

Cost of production.

Gram, one acre.	Cost.	Produce.	Value.
	Rs. a. p.		Rs. a. p.
Ploughing six times ...	3 2 0	Gram, 10 maunds @ 32 seers per rupee,	12 8 0
Do. and sowing ...	0 12 6	Alsi, 1 maund @14 do. do.,	3 0 0
Seed, 1¼ maund ...	1 9 6	Bhûsa, 12 maunds @ 6 maunds per Re.	2 0 0
Cutting ...	0 9 0		
Threshing ...	0 15 0	Total produce Rs. ...	17 8 0
Winnowing ...	0 3 0	Deduct total cost Rs. ...	11 3 0
Rent ...	4 0 0		
Total cost Rs. ...	11 3 0	Balance profit Rs. ...	6 5 0

Injuries. Owing to the plant having very short roots it is very liable to be blown up in high winds, and is peculiarly susceptible of frost. "Lassi" attacks the plants.

Bahádurá (a large caterpillar) attacks the young pod and destroys the grain.

Area. The area recorded under this crop in the measurement papers is 57,226 acres.

General. Oxalic acid forms on the leaves when dew has fallen on them, and causes considerable irritation to the naked foot when walking through a field of gram.

POPPY.

Name of crop.			Statisti							
English.	Hindi.	Botanical.	Ploughing.	Time of sowing.	Seed.	Weeding.	Watering.	Collection.	*Outturn.* Opium.	*Outturn.* Seed.
Poppy.	Post,	Papaver somniferum.	8 to 16	End of November.	3 seers	3 times,	4 times,	Middle of March	8 to 10 seers.	6 mds.

Varieties. None.

Preparation of land manure. Poppy is often sown after maize or *kákun*. The ground is heavily manured (200 maunds to the acre) and watered previously to sowing (*parch*), the soil being carefully pulverised. Poppy may be sown in the same soil every year, as animal manure and decayed vegetable matter restores it (Opium Manual). Goat and sheep dung is very beneficial.

Sowing. The seed is sown broadcast, a smoothening log run over, and the watering beds made ($6\frac{3}{4}$ by $7\frac{1}{2}$ feet) larger than for other crops, to allow of the irrigation being more gradual.

Intermediate operations. Poppy requires three or four waterings and at least three weedings. The first weeding is carefully done by a large number of men, estimated from 30 to 50 to an acre: each weed is picked with the fingers (*chutki se*). The other weedings are done with the hoe by 12 to 16 men per acre.

Harvest. First the petals are taken off by the hand formed like a tube and run up the plant; they are not pulled off. Then in one-third of the field incisions are made in the poppy heads and the exuded juice is scraped off next morning up to noon. For the remainder of the day a second third is so treated, and so on in rotation, each head being cut twice, thrice, or even four times. Men employed in this get two annas a day: the labourer must be more or less skilled, as the outer rind (pericarp) only must be cut. Finally the heads are cut off by the women of the family and stored till dry, when they are broken and the seeds separated from the husk.

Outturn. Varies according to season from eight to ten seers per acre. To each five seers opium three maunds seed.

Uses. The juice is collected in earthen pots, and is the opium of commerce.

The petals are made into flat cakes (*chapattis*) and are used for packing the opium.

The seeds are used for sweetmeats, curries, or oil is expressed from them on the usual terms. The oil is used for burning or for cakes amongst the poor.

The husk is much in use for fomentations.

The leaves and stalks are sold as " trash" for packing the opium cakes in.

Manufacturing process. Is thoroughly described in the Opium Manual, to which I refer.

Price. The details of price are also given in the Manual; on an average four to six rupees a seer is given according to quality.

The seed in good years fetches Rs. 4 a maund, but if mustard has been plentiful, as little as Re. 1-4-0.

Of oil the cultivator gets back one-third of gross weight of material supplied to the *teli*.

" Trash" fetches 12 annas a maund, but in this district the cultivator does not usually go to the trouble of pulling up the stalks; or if he does, he only burns them. *Pansáris* (druggists) buy the heads (*bondi*).

Cost of production.

Poppy, one acre.	Well.			Cost by canal one lift.			Canal flush.			Produce.	Value.		
	Rs.	a.	p.	Rs.	a.	p.	Rs	a.	p.		Rs.	a.	p
Manure	2	0	0	2	0	0	2	0	0	Opium, 10 seers at Rs. 4-8-0 per seer.	45	0	0
Ploughing 10 times ...	6	4	0	6	4	0	6	4	0				
Seed, 3 seers	0	4	0	0	4	0	0	4	0	Seed, six maunds at Rs. 4 per maund.	24	0	0
Making irrigation beds and clod crushing	0	10	0	0	10	0	0	10	0				
Watering before sowing	5	4	0	1	5	0	0	3	0	Total produce Rs. ...	69	0	0
Cost of " nándha" ...		...		0	1	6		...					
Cost of rope and " beri"...		...		0	2	6		...					
Ploughing after sowing and making irrigation beds again.	1	0	0	1	0	0	1	0	0				
	0	5	0	0	5	0	0	5	0				
1st weeding ...	3	0	0	3	0	0	3	0	0				
2nd do.	1	0	0	1	0	0	1	0	0				
3rd do.	0	8	0	0	8	0	0	8	0				
Watering 3 times ...	15	12	0	3	15	0	0	9	0				
Canal charges ...		...		2	0	0	3	0	0				
Collecting juice ...	13	8	0	13	8	0	13	8	0				
Cutting poppy heads ...	0	8	0	0	8	0	0	8	0				
Breaking up heads ...	0	4	0	0	4	0	0	4	0				
Rent	10	0	0	10	0	0	10	0	0				
Total cost Rs. ...	60	3	0	46	11	0	42	15	0				
Total produce Rs. ...	69	0	0	69	0	0	69	0	0				
Deduct cost per head Rs....	60	3	0	46	11	0	42	15	0				
Balance profit Rs. ...	8	13	0	22	5	0	26	1	0				

Injuries. When the plant is two inches high drought produces " bahádurá" (caterpillar), which watering drives up the plant where birds eat it. It is usual to put gourd and castor-oil leaves near the plants, which attract insects, and on which they can be caught.

East wind is very bad for the poppy; juice will not exude. West wind is favourable if unaccompanied by clouds. Rain and damp breed blight.

Smoke is injurious.

Saline water is injurious. "Soil composed of saline earth, or where nitre is seen diffused in other earth substances, or land abounding in siliceous or calcareous earths, where the latter is found in form of *kunkar*, are to be avoided." (Opium Manual.)

Area. The area under poppy, according to the settlement papers, is 5,009 acres, but it is extending every year.

Other castes besides *Káchhís*, even Thákurs and Brahmans, now grow it.

General. The advance (about Rs. 8 per acre) comes most opportunely in September, either to meet the first instalment of rent, to carry on till the kharíf harvest, or for its legitimate purpose, preparing the ground for the crop, and repairing or construction of wells.

This advance is accounted for at the weighments in May, where a still further 2 annas per rupee is held up till further test of quality has been made at the head office. This 2 annas is paid, if allowed, in the following September.

The red-flowered poppy gives less juice, and is therefore carefully eradicated. There is also a superstition that a red flower amongst the white attracts the evil eye.

MUSTARD.

(Oilseeds.)

Name of crop.			Statistics per acre.							
English.	Hindi.	Botanical.	Ploughing.	Time of sowing.	Seed.	Weeding.	Watering.	Cutting.	Threshing.	Outturn. Grain.
Mustard.	*Sarson*...	Sinapis dichotoma	With rabi crop.	With rabi crop.	½ seer ...	With rabi crop.	With rabi crop.	Before rabi.	...	2 maunds.
	Lâhi } *Rái* }	Sinapis ramosa.	...	...	½ seer ...	...	...	...	...	½ maund.
	Duán...	Colza? ...	...	...	⅛ seer ..	...	...	...	...	Mostly given as green food.

These plants are usually sown with wheat, barley, or their mixtures, partly to supply green food to the cattle, but chiefly for oil.

Rái.

Rái is a third taller than *sarson* and spreads more, its leaf being larger, but pods smaller: in these the seeds lie with a twist (as if rifled), are small and dark: those of *sarson* lie in two rows divided by a partition, and are yellow in colour. There are more flowers also in one head of *rái*, and the petals spread more widely than in *sarson*. It is always sown in rows because from its size it might injure the rabi. It is given to cattle green, and its seed is pressed for oil, giving of gross weight of produce one-fifth oil to four-fifths oilcake. The oil is not used for food, but the seeds are ground and put in pickles, &c., to give a flavour.

Sarson.

Sarson is sown scattered. Its seed gives one-third oil to gross weight. The oil is known by the name "karua tel," and is dearer than sweet (*mîṭhá*) oils. It is mostly eaten, and not burnt.

Duán.

Duán or *seohán* is the smallest of the three, and is never three feet high; its branches are bent, and on each bend is a sprout. The pods are small like buds, the flower is a faint yellow mixed with white. The leaf is small, there being four on one knot. It is sown round the rabi field generally (and hence called *mendha*), and much given as green food to cattle. The seed is pressed for oil, which is never eaten, but burnt or used for hair oil. The seed is threshed out of the plant in the usual way; the stalks are not given as fodder.

OTHER OILSEEDS.

Name of crop.			Statistics per acre.
English.	Hindi.	Botanical.	
Sesamum ...	*Til* ...	Sesamum orientale.	
Flax ...	*Alsi* ..	Linum usitatissemum.	Sown with other crops.
Safflower ...	*Kusam* ...	Carthamus Tinctorius.	

Of these the two first are grown exclusively for their oil, the third for the petals of the flower also, which give the common yellow dye of the country.

Til is grown mixed with *jwár*, cotton, and *bájra*, sown broadcast with them. It is cut separately, ripening before the primary crop, threshed out, and the seed made over to the "teli" or oil-presser, who returns one-third the gross weight in expressed oil and two-thirds cake: for this he is paid by an equal weight of grain to that of the oil, not usually in wheat. If, however, the proportion of oil is under the average weight, the cultivator loses, whilst any oil *over* the average weight the oil-presser keeps.

Alsi is sown in rows with *bijhra* or *chana* crops which are unirrigated. The cattle will not eat the plant as green food; it sticks to the palate. In this district the seed is always used for oil, of which the *teli* gives back one-fourth of the gross weight, keeping the cake himself. The oil is strong, and is used in poultices on boils, in a less degree for burning, and for the hair. The refuse is largely bought by chamárs, who apply it to the soles and stitching of shoes. Boatmen also use it for caulking their vessels; it is not given to cattle, nor will cattle eat the chaff unless mixed with other food.

Kusam is doubly useful; from the end of January till March the petals are pulled every week, collected and sold to the baniya at 10 seers per rupee. The picker is paid by one-tenth of the outturn.

The seed is given to cattle as food, or made over to the *teli* for the oil to be pressed. This oil is commonly used to adulterate *ghí*.

Name of crop.			Statistics per acre.								
English.	Hindi.	Botanical.	Ploughing.	Time of sowing.	Seed.	Weeding.	Cutting.	Digging.	Chopping.	*Outturn.* Root.	
?	*Ál.*	Morinda citrifolia.	5	*Sáwan*	2 maunds.	8 times ploughed twice.	20 men a day.	10 men a month.	4 men a day.	10 maunds.	

Varieties. None.

Preparation of ground. *Ál* is grown in "már" because this soil is friable (*poli*). Land designed for *ál* is sown with rabi for two or three years, but is not manured.

Ploughing. On first fall of rain the land is ploughed with the "bakhar" not less than five times; oftener if possible.

Sowing. Towards end of *Sáwan* the seed is sown broadcast, and thoroughly mixed in the ground with the *bakhar*.

Intermediate operations. Early rain after sowing is absolutely necessary; then the plant sprouts in 20 days, when it is weeded four times. It has to be protected from being injured by cattle, which, though they do not eat it, trample down the young plants. In the second year's rains it is about two feet high, and is weeded twice. In the third year's rain the field is ploughed (*bidhánd*) to allow the rain to reach the roots of the plant, and the same the fourth rains.

Cutting. About the end of December the trees are cut down (about twenty men will cut an acre in a day) and the roots are dug up with *koddlis*: this will take ten men a month, as the ground has to be dug carefully and to the depth of two feet. When brought home four men will chop it up into lengths; eight men sorting into different classes (*bánd*); each root is divided into three according to thickness. It is then dried for a month and packed close in gunny bags. The seed is collected in the third year; the kernel is separated from the shell by the seed being kept watered till the shell rots, when the kernel is stamped out with the feet or a *phúorá*.

Outturn. An acre will produce about 10 maunds root, one-third being of each class; five maunds seed is also obtained.

Price. The price has fallen so greatly of late years that it can hardly be grown except at a loss. It is a pure speculation. The thin end of the root is the best, and fetches now Rs. 8 per

maund ; next, the middle portion, which fetches Rs. 4 per maund ; and last, the thick end, the least valuable, worth Rs. 2 per maund.

From the root is extracted a red dye, being the dark-red, which is the colour seen in *khárua* and other native cloths.

Uses.

According to the estimate given, this crop can now only be produced at a loss as follows :—

Cost of production.

	Rs.	a.	p.	
Seed	... 6	3	0	
Weeding	... 9	8	0	
Cutting	... 1	4	0	At above rates produce comes to Rs. 46.
Digging	... 37	8	0	
Sorting	... 1	0	0	
Bags	... 2	0	0	
Watching	... 16	0	0	
Rent	... 16	0	0	
Total cost Rs.	... 89	4	0	Exclusive of ploughing.

The area recorded under this crop in the measurement papers is 137 acres.

Area.

It is a superstition that whoever digs up the roots of the *Ál* destroys or extirpates ("bekh-kan-karna") his *ál áulád* or family ; hence but few grow it, and generally of the baniya class : only those in fact who may be called lucky, "sazawár."

General.

The different classes "báná" are called as follows :—

1*st class*—thin, *hárgharka* ("bhara" Jalaun, "bár" Jhánsi).

2*nd* ,, —middle, *lari* (*jharan* Jalaun, *pachmer* Jhánsi).

3*rd* ,, —thick, *pachhkat* (*ghatiya* Jalaun, *lari* Jhánsi).

Bárá are the thin threadlike roots on the principal top roots collected and packed with 1st class. Very thick roots are called "katerão ;" they are almost worthless, but are peeled and mixed with *hárgharka* by way of adulteration.

See also a note by Mr. Fuller, Assistant Collector, on dyes and dyeing.

SUGARCANE.

(Annual.)

Name of crop.			Statistics per acre.							
									Outturn.	
English.	Hindi.	Botanical.	Ploughing.	Time of sowing.	Seed.	Weeding.	Watering.	Cutting.	Gur.	Rób.
Primary.										
Sugar-cane.	*Úkh.*	Saccharum officinarum.	20	February.	4,000 slips.	2 and 2 diggings.	8	Jan. 15th to Feb. 15th	Mds. 20	Mds. 4
Subordinate.										
	Castor oil.									
	Patsan.									
	Melons.									

Varieties. The varieties grown in this district are numerous :—

1. *Barokha.*—The most common, is thin, with a reddish hard bark; its knots are about eight inches apart. On account of its hard bark it is not eaten: the juice is sweet and thick; the *gur* not very dark, but consistent. This sort is an annual.

2. *Chitára.*—Is twice as thick as *barokha*, with a light green-coloured soft bark, a favourite edible. The juice is less sweet than that of *barokha* and thinner, but there is more of it. It is apt to remain as *ráb*, and does not set into "bhelis." An annual.

3. *Matna, Subia.*—Are thicker still, and the knots are closer; there is less juice, but it is thicker. The *gur* is eaten. An annual.

4. *Paunda.*—The popular edible cane, with thick stalks.

5. *Mangu.*—Biennial, a very luxuriant plant.

6. *Tanka.*

7. *Kariba.*

Preparation of land, manure. Cane wants the best land that can be given; it must have manure and water; hence it is grown chiefly in the home lands, or the fields next nearest the site, or in strong alluvial

soils where unfailing moisture can be obtained. The land is always heavily manured with at least 200 maunds to the acre.

Ploughing.

The field cannot be ploughed too often, never less than eight times, and as many as twenty are given in my experiments.

Sowing.

After the ploughings the field is watered, during which time the cultivator with his friends (*jita pára*) cuts the canes he has bought for seed from the field in which they stand, strips, cut them up into slips, "painṛá," each slip including a knot (canes are generally chosen for short knots), and buries them under "patel" grass and earth in a square hole dug for the purpose, and waters them to induce them to germinate. Leaving the slips for five or six days, he ploughs every evening, and leaving the field to drink in the dew at night, harrows in the morning, and then takes up the slips, and starts two (sometimes three) ploughs. The first makes shallow furrows, the second has two boards (*pakhá*) to throw off the earth; the slips are thrown into the furrow made by the last plough; seven men are employed,—two plough, two bring the slips, one carries them by the ploughmen in a basket, two sow. The field is then harrowed over the same night.

Intermediate operations.

Two days after sowing the field is again harrowed, and in fifteen days (*i. e.*, before leaves appear above ground) it is weeded by eight men. A fortnight after it is watered for the first time, and then dug up (*goṛna*) with *kudáre* and stamped down with the feet. Altogether the field is watered six times, or oftener if rains are late, and perhaps once again in the cold weather, as was done by one informant to keep off frost. It is also dug up (*goṛna*) twice at least, and perhaps given a second weeding with the hoe. A wall too is built round to keep off wild animals (canal officers look to a regular demand for water for this purpose).

Harvest cutting, &c.

The time for cutting varies. Edible canes come into the market in November, though it is a superstition not to cut before *Kátik* 11th. Cane for sugar is generally cut in *Mágh*, or from January 15th to February 16th, when the cultivator has thorough leisure from his rabi cultivation. Meanwhile the sugar-mill (*aindhi*) will have been got ready, the press cleaned and strengthened (*tápna*), a new chopping block sunk in the ground, filtering vats prepared, the boiling-house roofed, and the iron vessels (*karáhi* or *karháo*) in which the juice is inspissated hired for the season. The *karáh* is worth Rs. 40, and lets at about Rs. 10 a season. In all this four or five men club together. Friends being collected, about twenty bundles are cut and carried to the mill that afternoon: for cutting and carrying, the tops, "agaura" (excellent food for cattle), and three or four canes per bundle are given.[1] As the bundles arrive, the canes are cut into slips

[1] The stem leaves, "patti," are used as bedding.

(*gaṛeri*) by a hired man, paid one and a quarter anna and a seer of *ráb* per diem. The material (*ghán*) is carried to the mill, pressed, and the juice exudes through a hole below into a *nánd* fixed in the ground. Two *nánds* will be filled from ten bundles: when the *nánds* are full the mill is stopped, the juice put in the boiler and boiled till midnight, tended by four men, whilst a hired man feeds the fire from outside. When sufficiently boiled the juice is taken out with a spoon (*dohrá*) and put into earthen pots (*kundári*), in which it is stirred with hoes till it coagulates, when it is broken into twenty-seven or twenty-eight lumps (*bhelis*). The remaining ten bundles will be treated in the same way next morning, and so on till the field is cut. When the boiler is taken off at midnight they will put in the juice obtained by pouring water on the pressed slips (*khoi*) and allowing it to trickle into a *nánd* from a slanting *chabútra*, the juice being often twice poured over cane.

Outturn.

In two experiments I have made the outturn has been under 10 maunds (*gur*) per acre, but in one 33 maunds 28 seers were obtained. I look upon 320 bundles giving 20 maunds *gur* as a fair average outturn that may in ordinary years under favourable circumstances be expected. In addition four maunds "ráb" will be got. There is besides the produce of the castor-oil plant and the hemp, and till *Jeṭh* melons are often grown in the cane field, producing about ten rupees' worth of fruit (the stalks are dug in for manure).

Uses.

It is hardly necessary to describe the uses to wich sugar is put.

Manufacturing process.

This I have described above. I may here describe the mill.

The *kolhú* or mill consists of the following pieces:—

The mill itself, or *kolhú*, is made of *babúl*, tamarind or *siris*, and costs Rs. 4 to Rs. 6. Round the top a frame of *babúl* is bound (*bunná*) by a wattle of *arhar* stalks plastered with mud. The spout from which the juice runs is called *patokhá*.

			Rs.	a.	p.
The upright or *ját*	(in Mainpuri *Lát*) costs	...	1	0	0
The boom or *kántar*	(„ *Páth*) ...	...	2	0	0
The outer upright, parallel to *ját* } or *sena*	(„ *Malkham*) ...	...	0	8	0
The wood that joints *ját* and *sena* at the top } or *patli*	(„ *Chuya* or *bileya*)	...	0	0	4

are of *babúl*, the whole costing about Rs. 10, lasting about three years, and being the common property of from four to five men.

Price.

Gur sells for the cultivator at from 10 to 14 seers the rupee according to quality; early pressings fetch more.

Cost of production.

Sugarcane, one acre.	Well.	Cost by canal one lift.	Canal flush.
	Rs. a. p.	Rs. a. p.	Rs. a. p.
Watering "(Parch-na)" ...	5 4 0	1 5 0	0 3 0
Manure ...	2 9 0	2 9 0	2 9 0
Ploughing 6 times ...	3 12 0	3 12 0	3 12 0
Seed, 4,000 canes ...	8 14 6	8 14 6	8 14 0
Cutting canes in field and clearing ...	0 5 0	0 5 0	0 5 0
Cutting slips for seed and burying in the ground ...	0 5 0	0 5 0	0 5 0
Sowing ...	1 9 0	1 9 0	1 9 0
Clodcrushing ...	0 5 0	0 5 0	0 5 0
Making irrigation beds	0 5 0	0 5 0	0 5 0
Watering 8 times ...	42 0 0	10 8 0	1 8 0
Cost of "nándha" ...	0 0 0	0 1 6	0 0 0
Do. rope and "beri"	0 0 0	0 2 6	0 0 0
Canal charges ...	0 0 0	3 5 4	5 0 0
Thinning (gurái) ...	3 12 0	3 12 0	3 12 0
Watching melons ...	1 9 0	1 9 0	1 9 0
Rent ...	10 0 0	10 0 0	10 0 0
Total cost (B)...	80 9 6	18 11 10	40 0 6
Total produce ...	111 14 0	111 14 8	111 14 0
Deduct total cost ...	80 9 6	18 11 10	40 0 6
Balance profit ...	31 4 6	63 2 2	71 13 6

	Produce (if sold standing).	Value.
		Rs. a. p.
	Cane, 40,000 at 500 per rupee ...	80 0 0
(A.)	Castor-oil seed, 3 mds. at 16 seers per rupee	7 8 0
(A.)	Melons	20 0 0
(A.)	Beans	0 8 0
(A.)	Castor-oil stalks, 15 bundles ...	1 14 0
(A.)	Cane leaves, *agaura* ...	2 0 0
	Total produce ...	111 14 0

Produce (if pressed).	Well.	Cost by canal, one lift.	Canal flush.
	Rs. a. p.	Rs a. p.	Rs. a. p.
Gur 20 mds. at 12 seers per Re. ...	66 10 4		
Ráb 5 mds. at 16 seers per Re ...	12 8 0		
A.—Add castor-oil seed, &c. ...	31 14 0		
Total ...	111 0 4	111 0 4	111 0 4
Deduct—			
Share of cost of mill ... 3 8 10			
Do. *aindhi* 0 5 6			
Labourers 5 0 0	89 7 10	57 10 2	48 14 10
Add total cost B. ... 80 9 6			
Balance profit ...	21 8 6	53 9 10	62 1 6

Cane is chiefly liable to ravages of the insect *lákha*, and is also susceptible to frost, which dries up the juice. Pigs injure it much, but it is generally protected by a wall set with brambles.

Injuries.

The area recorded under this crop in the measurement papers is 13,773 acres.

Area.

Cane is never sown on *Mangal* (Tuesday), because the earth is supposed to sleep on that day, which is called after her son ; nor in "Bhadra Nachattr." After sowing, the remaining slips are always scrambled for (*uchhálná, luṭáná, noḥar.*) On *Deo uṭháni, ekádashi Kátik* the cane is worshipped by *ghí* and *gur* being burnt in the north-east corner, and presents of four or five canes are given to friends. One man informed me that before sowing he set up fourteen or fifteen

General.

plants in the centre of the field and worshipped with *ghí* and molasses, and then knocked them down to typify the bending down of the cane from its weight: after this a little feast was given.

The *paunḍa* cane calls for separate notice.

It is more carefully sown, being sometimes bedded out and watered constantly. In the alluvial lands of the Ganges it is watered every third day by the "ḍhenkli" from *chohas* (small holes). It is manured when 1½ feet high, weeded every week for a couple of months. It is cut from *Bhádon*, and is generally sold standing to "kunjarás." An acre is nominally worth Rs. 100, but I sold some by auction for Mr. Buck on the municipal land at Rs. 250 the acre.

In the Jumna parganas cane (usually *barokhá*) is grown without irrigation. After sowing the ground is covered with a layer of grass, which keeps off the heat of May and June; this process is called "paleo." When rain falls the field is uncovered and the cane grows as usual.

The stocks (*peri*) of the biennial canes are left in the ground, and give a second but poorer crop the following year.

EDIBLE ROOTS.

Name of crop.			Statistics per acre.						Outturn.	
English.	Hindi.	Botanical.	Ploughings.	Time of sowing.	Seed.	Weeding.	Watering.	When dug.	Wht.	Price.
Potato	*Álu*	Solanum tuberosum.	20	Novr.	2 mds.		2 or 3 times a month.	February	200 mds.	12 annas to Re. 1-4 per md.
Yam	*Ratálu*	Dioscorea sativa.								
Sweet Potato	*Shakarkand. Zimikand*	Batatas edulis.	5 or 6	Aug.	1 md.	Twice	3 or 4	February	42 mds.	8 annas per md.
	Ghúyán	Arum colocasia.		Feb.	16mds.	8	once a week		50 mds.	do.

The cultivation of the potato is spreading in the district. It is grown round Cawnpore (but not largely till the cultivation was encouraged by Mr. Buck, by his settling a colony of *Káchhis* from Farukhabad, where the triple-cropping—maize, followed by potatoes and then by tobacco—is practised), and a good deal in the rich *Kurmi* villages of parganas Sheorajpur and Bilhaur, where manure is most plentiful, or can be brought from adjacent encamping grounds. The cultivation is on the European method; the ground is heavily manured, ridges *(kháwá)* are made with the spade *(pháora)* after as many ploughings as possible, the eyes being dibbled in about six inches apart. The plants are watered two or three times a month till ripe, according to the weather.

Two hundred maunds per acre is not an extraordinary outturn, but the expense of cultivation is enormous.

The *shakarkand*, *ratálu*, and *zimikand* are garden crops grown by *Káchhis* in ground fairly well manured. The tubers are dibbled in and watered, the crop is again watered three times at least, and dug up in February. There are two kinds of *shakarkand:* (1) red, long, thin, and not stringy and sweet; (2) white, short, and more stringy. It is often exchanged for an equal weight of grain *(khont barábar lená)*, but sells at Re. 1 per maund. Being dug early it can be followed by a crop of *chena* or some vegetable. The stalks are given to cattle as fodder. The cultivator can make, if he pays for labour, Rs. 15 an acre profit, unless the rent taken is very high.

Ghúyáns are sown in February, and require constant watering, once every week at least, and also eight weedings: as in addition, 16 maunds seed per acre is sown. It is not a very paying crop, the average outturn being 50 maunds per acre; it is not extensively grown in this district. When it is dug half a seer of the root is given to the labourer instead of *chabena*. It is a poor tasteless vegetable, and a very poor substitute for potatoes.

GARDEN CROPS.

Name of crop.			Statistics per acre.						
								Outturn.	
English.	Hindi.	Botanical.	Ploughings.	When sown	Seed.	Weeded.	Ripe in	In weight.	In value.
									Rs.
Egg plant.	*Baingan,*	Solanum melongena.	3 or 4	*Asárh,*	½ seer	8 or 9 times.	Novr.	17 mds.	10 to 12
Carrot.	*Bhindi, Gajar,*	Daucus carota.	8 or 10 2 to 5	*Asárh* and *Kwár,*	14 to 16 seers.	24 men to an acre.	Novr. or Feby.	40 do.	30
Radish.	*Múli,*	Raphanus sativus.	2 or 3	do.	2½ to 4 seers.		Novr. or Feby.		20
Red pepper	*Mirich,*	Capsacum frutescens.						2 do.	4
Spinach.	*Palákí,*	Spinacea oleracea.							
Fenugreck.	*Methi*	Trigonella fenugrœcum							
Anisced.	*Sonph,*	Pimpinella anisum.							
Cumin.	*Ztra,*	Cuminum cyminum.							
Ginger.	*Soya, Adrak,*	Amomum zinziber.							
Turmeric.	*Haldi,*	Curcuma longa.							
Bean.	*Ronsa or Lobia,*	Dolichos sinensis.							
Do.	*Sem,*	Phascolus magnus.							

The above are grown chiefly by *Káchhis,* and are therefore generally known as *kachhiána.* I have described elsewhere (para. 76) the incessant labour the market gardener class bestow on their crops, which are grown in the best land of a village, that near the site.

The ground for *baingan* (also called *bhátá*)[1] is, if necessary, manured with about 160 maunds per acre, and the ground ploughed three or four times. It is sown in *Asárh (i. e.,* at fall of the rains), 1lb. seed per acre being sown in seed-beds and the seedlings planted out. The plant is dug up *(guṛái)* twice and weeded eight or nine times, and as it occupies the ground the whole year it is watered every week after the rain ceases to fall, and "*nona*" (or saline earth) is applied to the roots. The plant fruits from November to March, the ripe fruit being pulled daily. It is much grown by *Kewats (mallás)* on the *kachhár* lands of the Jumna.

The other vegetables are grown much in a similar manner; weedings and waterings vary, but as the gardener is at one or the other from morning to night, and the general result to him is more wanted in this place than a handbook on gardening, it is unnecessary to give further details.

[1] *Bádinján,* Pers., corrupted into *brinjál.*

A *káchhi* can make an acre of garden land pay him at least Rs. 40 in the year, and when it is considered that the labour of himself and entire family are devoted to the work, this result does not give an extraordinarily high rate of wage.

Carrots, however, are grown in small patches by all cultivators for their cattle (the heads are also given green), or near a well for the use of those at work there. Of course the outturn varies in such cases, being as low as eight maunds, for a fair crop fourteen maunds per acre.

Soya is one of the potherbs known as *ság*.

I may mention that the cultivation of turmeric is declining in this district since the price has fallen.

GOURDS.

(Cucurbitaceæ.)

Name of crop.			Statistics per acre.						
English.	Hindi.	Botanical.	Plough-ing.	Time of sowing.	Seed.	Weed-ed.	Water-ing.	When cut.	*Outturn.*
Water-melon.	*Tarbúza,*	Cucurbita citrullus.	Once	June or Decem-ber.				October & March	Rs.
Melon.	*Kharbúza,*	Cucumis melo.	8 or 9 times.		2seers.	Once		June ...	40
	Kakri,	Cucumis utilissimus.							
	Karelá.	Momordica charantia.	8 to 10 times.	January, Febry.		Every week.	Every 3rd day.	May and June.	24
Bottle gourd.	*Laoka,*	Cucurbita logenaria.							
	Taroi,	Cucumis acutangulis.							
	Phút,	Cucumis momordica.							
Cucumber.	*Khíra,*	Cucumis sativus.							

Sowing.

The water-melon is also called *kalínda.* It is sown unmanured in sand, four or five seeds being put into one hole. It is only liable to injury from east wind. Each plant should bear from eight to fourteen fruit, fetching one pice to one anna, according to size and quality. They are considered cooling and given to allay fever.

The ground for melons is heavily manured before sowing (use of poudrette for this purpose is now common near municipalities), and again when the leaves form. The seed is sown in drills after the plough. It is weeded once. The leaves are not allowed to rest on the ground, matting is spread under them, and they are thereby saved from effects of frost; manure is again applied when the plants are a foot long. The fruit is much sought after by porcupines and jackals; insects attack the root, and "lassi" the leaves. The names of some of the varieties are *tíra, matira, surákhi,* &c. The seeds of *surákhi* are eaten cooked in syrup.

BETEL.

Name of crop.			
English.	Hindi.	Botanical.	
Betel ...	*Pán* ...	Piper betel.	

Varieties.

Kaker.—Large leaf, described as of mild flavour.
Desáwarí.—Round leaf, described as sweet.
Kapúri.—Long leaf, mild but slightly bitter.
Bangla.—Sweet.

Preparation of land.

Pán is sown on the slope of the mound *(bhít)* which is formed by the earth thrown out of a tank. Fresh earth is heaped up in the month of *Chait* (March) and the framework of *senthas,* bamboos erected, which protect the delicate plant during the hot wind. *Pán* and *jwár* are sown on the same ground in alternate years.

Planting.

The tender shoots from a growing plant are laid flat and covered with wet earth, then with grass, over which water from the pond is sprinkled four times a day. It is planted in rows, "mándha," of which in an acre there will be fifty rows of 125 cubits, each row three cubits broad, and a cubit between each row. In each row are thirty "kuntra," in each *kuntra* eight or nine *gáten,* in each *gát* six "*dhapian*" or lumps of clay in which the "senṭhá" is stuck and the plants sown, two to five being trained up each *senṭhá.* For each row the following must be bought—125 bamboos, four bundles "gándar" grass, and 1,000 "senṭhás" (stems of *múnj* grass); *kus* grass is brought in from the jungle and used for tying. The seedlings cost as follows:—

Per *dholi (v.i.), kaker* three annas, *bangla* and *desáwari* two annas, *kapúri* one anna.

Intermediate operations.

Constant labour is required to rear the plant; it must be watered twice every day till well grown, when once a day is enough; and after the rains every third day; fifteen

gharas of water per row are given, and one man can only water five rows in the day. Meanwhile plants of the pumpkin kind are grown over the framework to keep the interior cool, and the betel vines are trained up the light supports prepared for them. In *Sáwan*, *Bhádon*, and *Kwár* the plants are manured with a mixture of flour *(kanak)* and oilcake. This costs 10½ annas per row.

Picking.

"Jeṭh Dasera," the oldest member of the family, goes to the middle of the "*bhiṭ*," worships the "*Deota*" with a burnt offering of *ghí* and *gur*, and picks a *dholi* (200 leaves), which he distributes to his friends, from whom he receives presents (only the inferior leaves, however, are picked till *Kwár Dasera)*; after which the plant is pulled every fortnight as long as there is any left; five rows being left for seedlings, which are never touched except near the ground to keep them clean.

Uses.

Pán leaf is used for chewing mixed with *chúna* (lime), *kattha* (catechu), *supiári* (areca or betelnut), *ilaichi* (cardamoms) and tobacco, rolled up in the leaf *(bírá* or *gilauri)*, which is fastened by a clove or piece of *supiári*, and sometimes adorned with gold and silver paper. It is an excellent stomachic, *bangla* being much in favour in the cold weather, but *desáwari* is the kind most in request for festivals, &c.

Price.

The price varies according to age, thus:—

Kaker	from	*Kwar*	to	*Pús*,	per	dholi	2	annas; from	*Mágh* to *Cheit*	3 annas.
Desáwari	„	to	„	„		1½	„	„	ditto	2 „
Kapúri	„	to	„	„		1	„	„	ditto	1½ „
Bangla	„	to	„	„		1½	„	„	ditto	2 „

Sometimes in *Aghan* as high as eight rupees per *leso* is reached. *Pán* is often kept for a long time; old *pán* sells better than new, as high as eight leaves per pice.

I give facts as ascertained by me from two informants:—

Cost of production, one acre.

	Cost.			Produce.			
	Rs.	a.	p.		Rs.	a.	p.
Bamboos	93	0	0				
Grass	6	4	0	3,000 *dholis.*			
Sentha	18	12	0				
Seedlings	3	2	0	At one anna ...	139	0	0
Watering	10	0	0	At two annas...	97	0	0
Manure.	16	6	6	Total ...	236	0	0
Rent	20	0	0	Cost ...	167	8	6
Total ...	167	8	6	Profit ...	68	7	6

But in this instance the watering was paid for, which is unnecessary; and no account is taken on the credit side of the pumpkins, which fetch about Rs. 10 per "bhít." [The rent is generally so much per row, eight annas to Rs. 2, according to demand or custom. I found, however, on an average of years that Rs. 20 an acre is a fair rate per acre. In off years *jwár* is sown, and only four annas an acre is taken.]

For ten rows.	Cost.			Produce.	Value.		
	Rs.	a.	p.		Rs.	a.	p.
400 bamboos ... ... (had 400 old ones).	11	0	0	375 *dholis*=6 leso 15 dholis.			
				1 leso *desáwari*	5	0	0
Sentha, 30 bundles... ...	7	0	0	1 ,, *kapúri*	2	8	0
Grass	2	0	0	3 ,, *bangla*	16	0	0
5 labourers 3 days (to help in sowing).	1	6	6	Sold at odd times	4	0	0
				Value of seedlings... ...	56	0	0
1 labourer 10 days (to make framework).	0	15	0				
				Rs ...	83	8	0
Rs. ...	22	5	6	Deduct total cost, Rs. ...	37	5	6
Add rent, Rs. ...	15	0	0	Profit, Rs. ...	46	2	6
Total cost, Rs. ...	37	5	6				

Neither of these estimates is satisfactory.

Area. The area recorded under this crop in the measurement papers is 137 acres.

General. *Pán* is stored in "cholis" (holding one *ḍholi)* of "gándar" grass tied with *kus* grass, or in "jhawa" bamboo baskets.

The betel growers *(bárei)* are very averse to allow a stranger entering the vinery, fearing the *mal occhio.*

Terms.

Bhíṭ	...	...	Mound on which grown.
Mándah	...	...	Row.
Kuntra	...	...	Main props of bamboo.
Gát	...	...	Minor props of *Senṭhá*, one span apart.
Bel	...	...	Young seedlings for planting.
Dholi	...	...	200 leaves.
Leso	...	...	60 *ḍholis.*

Name of crop.		
English.	Hindi.	Botanical.
Water Calthrops.	*Singhára*	Trata natans.

The *singhára* is grown in the ponds *(tál, taleya, pokhar, gaḍha)* of nearly every village, forming one of the *siwái* or extra receipts. The *kahár* or water-carrying class almost exclusively cultivate it.

Sowing.

Plants that may have remained in a pond from last year are pulled up and thrown into a pit or pool of water where they germinate and are sold by the owner to purchasers by the *banghí* ($\frac{3}{4}$ maund) weight, one maund per rupee. The purchaser plants his shoots *(bel)*, which increase again, and he then sows as follows:—He prepares 800 pegs as thick as his finger, points them with his sickle, and ties each plant *(bel)* to a peg with *kus* grass. Floating on a support of two *gharas* upside down joined by a bamboo, he plants out his pegs, diving where it is deep ; thirty-two men would sow an acre in a day.

Intermediate operations.

The plant must be examined every day for the purpose of clearing off the insects. The owner and his friends (as *kahárs* generally join in a lease they have not to hire labour) astride on their rafts float round the pond doing this : eight men will manage an acre in the day.

Harvest.

The plant flowers in November, and on *Deo uṭhání Ekádashi*, or five days before the end of *Kátik*, *singháras* are eaten and given as offerings. The owner pulls as many as he wishes for sale, and the nuts continue forming till the end of December, when the plants rot, the nuts fall, and are dragged out by a primitive drag. They may be gathered in this way as late as the end of February, as the nut is protected by its thick spiky shell.

Uses.

The nut is eaten raw or boiled when fresh. Druggists store them for use as offerings or to be made into flour for "pharhár," or the feast after a fast in which grain may not be eaten.

Outturn.

About ten maunds an acre would be a fair outturn—

Price.

fetching one anna a seer.

Injuries.

The *singhára* plant is so liable to the ravages of certain insects that in some years the whole crop is a failure.

The first that attacks is the "orna," very small, red in colour ; next the "chitya," white, even more minute (the size of a poppy seed); next the "sunri," a black caterpillar about a barleycorn in length ; and lastly, "ghuhán," yellow, as large as a small pea.

TOBACCO.

Name of crop.			Statistics per acre.							
									Outturn.	
English.	Hindi.	Botanical.	Ploughing.	Time of sowing.	Seed.	Weeding.	Watering.	Time of cutting.	Tobacco.	Jhalla or broken, and leaves takals.
Tobacco.	*Tamákhu.*	Nicotiana.	10 or 12.	July and planted out in October.	1 lb	Seedling 3 times, plants 3 times.	7 or 8.	End of February.	10 to 24 maunds.	5 maunds.

Varieties. *Desáwari* or *Desi*, country,—long narrow-pointed leaf. *Vilâyati* or foreign, round cabbage-like leaf. American, being gradually introduced.

Preparation of land. Tobacco is grown in the best land available, that near the site, which even then is manured with twelve tons of manure to the acre.

Sowing. One lb. of seed, which is calculated to supply seedlings for an acre of land, is sown in about one-fifth of an acre which has been prepared by manuring and seven or eight ploughings, and pulverised by the "henga or mai." Some *Káchhis* sow excess seed to allow for failures in germinating, &c. The seedlings having germinated in about a week, weeded by hand (*"chuṭki se"*) once and with the hoe twice, and also thinned out. They are transplanted in October, one man picking with his fingers the young plant from the ground which has been watered to allow the plants to be drawn out without injury to the root, a second carries to the man planting, who dibbles them in with the handle of his hoe. This is always done in the evening, that the young plants may not wither ; hence only sufficient plants are pulled for the evening's planting. The field is watered before planting.

Intermediate operations. The plants are weeded with the hoe three times and watered at intervals of a fortnight, in all six or eight times ; each weeding succeeds a watering. When the plant is about 1½ foot high and all the leaves have sprouted, the flower-shoots at the top and all the young sprouts which would form branches are pulled off to strengthen the leaves left, which are seven or nine. I have counted numerous plants and found seven, eight, or nine leaves on all. The lowest leaves are left ; for, though they get dirty and flabby from the water and wet earth, and are comparatively useless, by being left they protect the leaves above from being spoilt. The *káchhi* may be seen any day when he is not at his well going about his field picking off the young sprouts.

The plant begins to ripen early in February, being cut at latest by March 15th. Its ripeness is known by the blisters (*dudri*) on the leaves. The whole plant is cut as a rule, but sometimes only the leaves are stripped off and the stem left standing, from which a second crop of inferior quality and quantity is obtained in May, called "dulwa."

Being cut, the plant is laid out in the field for a fortnight, being turned over three or four times. When dry the leaves are stripped and tied up by a leaf into bundles of four or five leaves. If the colour is not good the bundles are spread out in the field and exposed to sun and dew for another three or four days. The bundles are then heaped up and allowed to ferment for three or four days, when they are turned over and again left for three or four days, and then taken home. A hole is dug and lined with cane or mango leaves, the bundles are put in and turned over every fourth or fifth day. In May they are packed in gunny bags ("borā") and fetched by the merchant; or the cultivator takes his tobacco to the best market. If the tobacco is for smoking the leaves are bound into ropes.

Outturn.

I should consider twenty maunds a fair crop which may be looked for under favourable circumstances: estimates vary from ten to twenty-four maunds. There would also be about five maunds refuse (*jhalla*), of broken leaves and stalks sold cheap (Re. 1 per maund), and bought by the poorest classes.

Price.

The price varies according to quality, which is often judged on the same principles as so many goods are,—by the name. Thus *Kanjati* tobacco is famous in this district, and sells at Rs. 12 the maund, but the ordinary qualities (and second cuttings) only at Rs. 5 or 6 the maund (the seer in this maund is Rs. 96).

Injuries.

Tobacco is liable to the ravages of no worm or fly in its growing state, but frost and hail are fearfully destructive to it. A weevil attacks the dried leaves.

Cost of production.

Tobacco per acre.	Cost.			Produce.	Value.		
	Rs.	a.	p		Rs.	a.	p.
Manure ...	10	10	0	Tobacco, 20 maunds at Rs. 6 per maund.	120	0	0
Ploughing 5 biswas for seedlings	0	10	0				
Seed ...	0	4	0	"Jhalla" of broken leaves and stalks, 5 maunds.	5	0	0
Ploughing ...	6	4	0				
Making irrigation beds ...	0	6	0				
Transplanting ...	1	14	0	Total produce ...	125	0	0
Watering ...	33	0	0	Deduct total cost ...	68	12	0
Weeding four times ...	4	14	0				
Cutting, &c., ...	5	13	0	Balance profit ...	56	4	0
Turning over leaves four times	3	0	0				
Tying into bundles ...	1	8	0				
Turning over bundles ...	0	9	0				
Total cost ...	68	12	0				

Area. The area recorded under this crop in the measurement papers is 1,257 acres.

General. Tobacco is invariably grown where *khárá páni* or saline water is obtainable. Where it is not, the necessary salts are provided by dressing with "*nona matti*," the earth collected from the bottom of walls and streets in villages.[1]

The virtue of *khárá páni* is due to the presence of nitric acid resulting from the decomposition of ammonia. The ammonia has its origin in the fact that *khárá páni* is found in wells sunk on the sites of deserted villages or forts, where, from the habits of the country, the soil has become saturated with urine, or much mixed with decomposed organic matter.

[1] *Loná* (=*noná*), or the oxalic acid collected from the leaves of gram, is much used in the preparation of nitric acid (*teste* Elliott).

PART III.

69. THE rotation of crops in this district is the simple one of alternative rain and cold-weather crops. No scientific system is carried out, and except perhaps in the case of hemp, the fallen leaves of which are admitted as strengthening the soil (whence it and sometimes cotton are grown on newly broken-up land to improve the soil), the effect of one crop upon another following it is not regarded. *Jwár* or *bájrá* one year followed by *bijhra* the next year is the almost universal sequence in the outlands. In the better lands maize is followed the same year by *bijhra*, and cotton the next year generally by wheat. Cane occupies the land for a whole year, being grown on land that has had a *kharíf* crop (generally cotton) the same year, and is followed by a rabi crop the year the cane is cut. The *Káchhi* never allows his land to lie idle, vegetable follows vegetable according to season, and as far as possible this drain on the land is met by constant manuring.

70. Double-cropping is most frequent where canal water induces the cultivator to take a crop of *bijhra* or peas after his indigo is cut; or again where the coarse rice is much grown, which being cut in Bhádon allows, if the land is worth it, some ploughing to be done before sowing time. In other tracts a few acres near the village site are sown with maize or (in the Jumna pargana especially) *sánwán*. The *Káchhis'* cultivation swells the area of double-cropped land.

71. The system of mixed crops is well known, and arises chiefly from the wish of the cultivator to have a little of everything, and by not "putting all his eggs in one basket," to provide against the risks of the season (see also Elliott's Supplemental Glossary). One form of this provision against all chances is seen in the long fields of the *kachhár* lands of the Jumna, which stretch from the cliff to the waters' edges, and the lower portions of which are submerged more or less in the rains. In the higher land *bájra* mixed with the castor-oil plant is sown; where these are destroyed by floods, they are replaced by *bijhra* or wheat.

72. I here give a detail of the crops of the entire district as obtained from the measurement records of the settlement department:—

Kharíf crops.	Area in acres.	Rabi crops.	Area in acres.	Miscellaneous crops.	Area in acres.
1. *Jwár* ...	162,184	Wheat ...	52,618	Cane, annual ...	13,773
2. *Bájra* ...	37,961	*Gujai* ...	20,918	Cane, biennial ...	887
3. Cotton ...	101,963	Wheat and gram mixed.	16,913	Poppy ...	5,009
4. Indigo ...	24,083	*Bijhra* ...	325,913	Tobacco ...	1,257
5. Pulses ...	8,015	Gram ...	57,226	Potatoes ...	300
6. Indian-corn ...	24,085	Peas ...	5,200	Melons ...	475
7. Small millets ...	3,620	*Masúr* ...	255	Vegetables ...	4,234
8. Rice ...	27,143			Safflower ...	1,184
9. Hemp ...	1,469			*Ál* ...	137
				Pán ...	137
Total Kharíf ...	390,523	Total Rabi ...	479,043	Total Miscellaneous	27,393

73. I have given under the head of each (principal) crop an estimate of the cost of its production as represented in cash. But it is needless to add that this expenditure of cash is never incurred. In the first place there is the labour of the cultivator, and in the lower classes of his entire family, down to the child of eight or ten years of age. In the next place there is the universal custom of mutual assistance (*jita*) ; and if it be replied that at this rate the cultivator does not get the ordinary rate of wage, it should be considered that his labour is not worth it. Where there is demand wages rise at once to the full rate, *e.g.*, in irrigation from canals water-lifters get two annas and one-quarter seer of *chabena;* or, again, where there is weeding to be done promptly after the rain clears off, but with certain duties to perform, and 365 days in the year in which to do them, the selling value of the cultivator's labour is reduced to a minimum. I repeat, if all the agricultural operations of the country had to be done in one day (to reduce the matter *ad absurdum*), the demand for labour would be so great that wages would rise to a height inconsistent with any profit: so when the cultivator and his family can perform certain duties, weeding, watering, &c., at his leisure, to value his labour at ordinary cost price is as good as to say that no crop can be grown at a profit. I propose by three examples of ordinary cultivators to show how the several operations of agriculture fit in to each other and are carried out with the minimum of cash expenditure. To each is attached an abstract of expenditure and receipts.

Chamár.

74. Take a *Chamár* with a wife and three children aged 8, 10, and 12 years respectively, and give him a holding of 12 bighas (about six acres) variously situated, so that he has every quality of land, and a pair of plough bullocks, his agricultural operations for the year will be much as follows :— Say his year begins from 15th *Jeṭh* or 1st June. He will first plaster and thatch his house, which will take him about a week ; he will then employ himself carrying what manure he has to the land which he intends for Indian-corn or cotton. He then waits for rain, which ordinarily falls in the beginning of *Asárh* or end of June. He will then plough for and sow his Indian-corn (1½ bígha) ; his family will help, and thiswill take two days. Next he ploughs his field for cotton (1½ bígha) twice, sows and levels it, taking three days ; in this too his family help. For the next ten days he will plough, sow, and level the fields for *jwár*, and then, as leisure offers and the rain clears off, he ploughs his remaining land for rabi. Meanwhile his wife and two children will gradually twice weed the maize, which must be done by the first week in *Sáwan* or 20th July. Cotton, however, requires weeding three or four times, at intervals of a week or ten days ; for this hired labour is necessary : 20 men will weed 1½ bígha in a day, but as it need not be all done in a day, the wife and two children will weed for three days, and the wages of eleven men for one day, or Re. 1-0-6, will have to be paid ; or for the four times a

Statement showing agricultural operations of a Chamár cultivator.

Crops.	Area in bighas (⅓acre).	Seed. Amount.	Seed. Price.	Weeding. Number of men.	Weeding. Wages.	Cutting. Number of men.	Cutting. Wages.	Total cost.	Amount of produce.	Price per rupee.	Value.	Remarks.
	B. b. b.	M. s c.	Rs. a. p.		Rs. a. p.		Rs. a. p.	Rs. a. p.	M. s. c.	M. s. c.	Rs. a. p.	
Indian-corn ...	1 10 0	0 3 0	0 3 0	...	...	...	...	...	3 0 0	0 30 0	4 0 0	Fodder has not been shown on either side of the account, receipts and expenditure counterbalance each other.
Juár ...	4 0 0	0 8 0	0 8 0	...	...	7	0 10 6	...	12 0 0	0 25 0	19 0 0	
Urd ...	...	0 4 0	0 4 0	...	...	...	...	...	2 0 0	0 20 0	4 0 0	
Til ...	...	0 0 8	0 1 0	...	...	...	...	...	0 20 0	0 10 0	2 0 0	
Cotton ...	1 10 0	0 3 0	0 3 0	44	4 2 0	...	...	...	1 20 0	0 7 0	8 8 0	
Castor-oil ...	...	0 1 0	0 1 6	...	...	...	...	..	0 20 0	0 13 0	1 8 0	
Total Kharíf...	7 0 0	0 19 8	1 4 6	44	4 2 0	7	0 10 6	6 1 0	11 20 0	...	39 0 0	
Wheat ...	1 10 0	0 35 0	3 0 0	...	...	...	...	...	8 0 0	0 16 0	20 0 0	
Bijhra ...	5 0 0	2 20 0	6 4 0	...	...	...	...	...	15 0 0	0 25 0	24 0 0	
Arhar ...	...	0 5 4	0 4 0	...	...	...	...	...	3 30 0	0 30 0	5 0 0	
Sarson (mustard).	...	0 1 10	0 2 6	...	...	...	...	...	2 0 0	0 12 8	6 8 0	
Total Rabi ...	6 10 0	3 21 14	9 10 6	...	...	...	...	9 10 6	28 30 0	...	55 8 0	
Rent ...	...	...	...	...	...	...	...	28 0 0	...	...	...	
Repair of well,	...	...	...	...	...	...	...	0 12 9	...	...	...	
Well gear ..	...	...	...	...	...	...	...	4 0 0	...	...	...	
Grand Total...	13 10 0	4 1 6	10 15 0	44	4 2 0	7	0 10 6	48 8 3	48 10 0	...	94 8 0	
									Deduct cost Rs.	...	48 8 3	
									Balance of profit ...		45 15 9	

Káchhi.

76. A *Káchhi* generally holds a smaller area than other cultivators; it is in the best land mostly, and he devotes his whole attention to it. Let us suppose a *Káchhi* with wife and three boys 8, 10, and 12 years of age respectively, and allow him eight bíghas of land, of which three bíghas are in the gauhán or homestead, four bíghas in the midlands, and one bígha in the outlands; he has one pair of plough bullocks, and either has a well of his own or uses a masonry well of the zamindár. His agricultural operations will be much as follows:—When the rain falls (about middle of Asárh, say, or end of June) he will plough for his maize (one bígha), taking two days, and will then with a hired labourer and his eldest boy sow the field up to noon. As every grain has to be separately and carefully sown, labour is increased; after noon they will clear the field of grass, weeds, &c., and level it. He then throws a cartload of manure on the maize field and ploughs for his jwár (one bígha), which takes a day; he then sows it and levels the field. He now sets to work to plough for his poppy and rabi crops, till in the beginning of Sáwan (or end of July) he, his two sons, and seven hired hands, costing 10½ annas, weed the maize, and next day the *jwár* at the same cost, and he then again ploughs his rabi fields. After this he and his son will plant out four biswas egg-plant and two biswas pepper, and again weed his maize as above. About this time he runs his plough through the *jwár* ("gurai" from "gorna"), which keeps the soil pulverised, lets the rain soak in, and thins out the crop, and goes on with his rabi ploughings. *Bhádon* has now arrived, and the maize has to be watched by a hired man who costs for 25 days Rs. 2-5-6. In the day the eldest boy, and at night the *Káchhi* himself help in the watching. During the day the father is employed in ploughing up to noon, and then looking after the cattle, &c. Now he and his two sons and one hired man will cut the maize, and next day with two hired men costing three annas cut the cobs from the stalks and pile them in the threshingfloor, where they will lie for a week, watched at night by the cultivator himself. In the day the field will be ploughed for a second crop, *bijhra*. When *Kwár* comes he will with his son sow carrots and radishes, and still plough his *rabi* fields, or, as leisure offers, thresh out his maize (sometimes with cattle, sometimes by merely beating the cobs with a thick club). *Kátik* having arrived, with one labourer he and his son will now sow the *rabi* (two bíghas wheat and one bígha *bijhra*) in three days, paying the labourer two annas a day, as there is great demand for labour at this time, and then make the irrigation beds. There is now a press of work, watching the *jwár*, watering the vegetables, preparing the field for poppy cultivation; so his second son will watch the *jwár* morning and evening, and the father with the eldest son and his wife will water the vegetables: when the boy comes back from the *jwár* fields the wife will go home and cook the food. It will take six days to

water the vegetables. The field for poppy will take twelve days to prepare by watering, and has at the same time to be broken up by the hoe, taking fifteen men costing Re. 1-6-6 : in this is included the sowing also. He will now with his son cut the *urd, múng, lobia,* and *til* sown with his *jwár*, and take them to the threshingfloor,—in all four days, and then cut the heads of the *jwár*. *Aghan* has now come and the *rabi* must be watered, taking fifteen days ; for this one man is hired, for the son is watching the grain on the threshingfloor. But in the meanwhile he will take a day for treading out the *jwár* and another for winnowing it, and a third for the small crops, so he has to pay the man hired Re. 1-11-0. The poppy now wants watering, which will take ten days, after which it is weeded by hand (*chuṭki se*), each weed being separately pulled up with the fingers ; this will take four days, and besides the family thirteen men must be hired costing Rs. 4-14-0, and weeding the wheat will cost Rs. 2-4-0, being at the rate of eight hired men for three days. The vegetables will now be watered, taking five days, and then weeded, eight men being hired for the latter employment. The vegetables, wheat, and poppy will be watered twice more, the *bijhra* only once, which will bring us to the beginning of *Phágon* (about February), when a field will be prepared for cane, being first watered, and then ploughed for four days. With hired assistance he will cut the canes he has bought for seed from the field where they are growing, strip off the leaves, chop the canes into lengths, dig a hole and bury the pieces in it, covering them with the leaves and moist earth. All this will have cost him about fifteen annas. When the pieces have lain three days, during which time he waters the vegetables again, he will sow them (as described separately under head " Sugarcane") at an expense of twelve annas. He has now two important duties, to keep the cane field properly pulverised, and to water the poppy, which will keep him ten days employed, whilst his wife and son pull the petals of the poppy flowers, which are made into cakes and sold to the opium agency. For the next fortnight he and four hired labourers will make the incisions in the poppy heads on the afternoon, and the next morning up till noon scrape off the exuded juice : this costs Rs. 5-10-0. Now to water and plough up (*goṛna*) the cane, costing twelve annas, and then the *bijhra* being ripe for cutting, he will call in two men, paid by a share in the crop (*lonhári*), and cut it in two days ; and after this the wheat, which takes half as long again. For a week the sheaves will lie on the threshingfloor watched by the man and his family : in one day they will pick the poppy heads : if pressed for time they will hire assistance. Then the *Káchhi* and his son will thresh out the *bijhra*, taking eight days, and the wheat, taking seventeen days, and then beat out the poppy seed, which the wife will clean from the husk. The winnowing will take a week, and bringing home a couple of days ; two men will be hired to help, costing Re. 1-14-0. The cane must now be watered

again, and a wall built round it to protect it from pigs, &c., after which the field will be manured by farm-yard refuse mixed with mud from the village pond. Some grain may yet be got out of the colder *(guthra,)* and then the cane must be watered again and ploughed up ; for the latter job hired assistance is necessary. By this time the rains may be again expected. For the method and cost of expressing the juice from the cane see the separate description. To express the juice from one bígha of cane will take eight days, the cultivator using his own cattle if he can find leisure from his irrigating, or, as sometimes happens, if he has no leisure, he will sell the field of standing cane, which will fetch about Rs. 40.

Statement showing agricultural

Name of crop.	Area sown in bighas (⅝ acre.)	Sowing.		Manure.		Weeding.		Watering.		Watching.		Making irrigation beds.	
		Number of men.	Wages.	Number of men.	Cost.	Number of men.	Wages.	Number of men.	Wages.	Number of men.	Wages.	Number of men.	Wages.
			Rs. a. p.		Rs. a. p.		Rs. a. p.				Rs. a. p.		
Indian-corn ...	1	1	0 1 6	...	0 2 0	14	1 5 0	..	...	1	0 10 0	...	...
Jwár ...	...	...	...	...	...	...	...	...	...	..	...	...	...
Kakun ...	...	..	...	...	...	...	...	...	...	...	...	...	...
Phút ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jwár ...	...	.	...	...	...	7	0 10 6	...	...	...	...	...	...
Urd ...	1	...	...	..	...	...	...	..	...	...	...	...	...
Hemp ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Til ...	...	.	...	.	...	...	...	.	...	...	...	...	...
Total Kharíf ...	2	1	0 1 6	..	0 2 0	21	1 15 6	...	...	1	0 10 0	..	...
Wheat ...	2	2	0 4 0	...	...	24	2 4 0	10	0 15 0	...	...	...	...
Bijhra. In maize field	...	1	0 2 0	..	...	...	...	5	0 7 6	...	...	...	...
Sarson (mustard) ...	...	...	...	...	...	...	...	..	...	..	...	...	...
Andi (castor oil) ...	...	..	...	.	...	...	...	...	...	...	...	...	...
Do. (do. plant) ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Vegetables.													
Egg-plant ...	...	.	...	...	...	...	...	...	...	...	...	...	...
Pepper ...	...	...	...	..	...	...	...	...	...	...	...	...	...
Spinach ...	1	..	...	...	...	8	0 12 0	...	...	...	...	...	...
Radishes ...	...	...	...	.	...	...	...	..	...	...	...	...	...
Carrots ...	...	...	...	.	...	...	...	...	...	...	...	...	...
Poppy ...	2	15	1 6 6	..	...	68	6 6 0	..	...	...	...	...	...
Poppy heads ...													
Arhar ...	...	...	...	...	...	...	...	..	...	...	...	...	...
Do. stalks ...	...	..	...	...	...	...	...	...	...	...	...	...	...
Total ...	5	18	1 12 6	...	...	100	9 6 0	15	1 6 6	...	...	...	...
Cane ...	1	18	1 11 0	...	2 2 0	14	1 5 0	...	...	...	...	...	...
Rábi ...	...	..	...	...	...	...	...	...	...	...	...	...	...
Melon ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	1	18	1 11 0	..	2 2 0	14	1 5 0	...	...	...	...	...	...
Rent ...	...	...	...	.	...	...	...	...	...	...	...	...	...
Share of cost of well	...	...	...	...	...	...	...	...	...	...	...	...	...
Share of cost of well gear.	...	...	...	...	...	...	...	...	...	...	...	...	...
Share of cost of mill	...	...	...	...	...	...	...	...	...	...	...	...	...
GRAND TOTAL...	8	37	3 9 0	..	2 4 0	135	12 10 6	15	1 6 6	1	0 10 0	...	...

Detail of holding ...		Rate. Rs. a. p.	Rent. Rs. a. p.
3 bighas	*gauhán* wet ...	5 0 0	15 0 0
4 „	*manjha* wet ...	3 8 0	14 0 0
1 „	*barhet* dry	1 12 0	1 12 0

operations of a Kâchhi *cultivator.*

Cutting.		Collecting.		Threshing and winnowing, &c.		Constructing wall for protection.		Seed.		Total cost.	Produce.	Price per rupee.	Total value.
Number of men.	Wages.	Number of men.	Wages.	Number of men.	Wages.	Number of men.	Wages.	Amount.	Price.				
	Rs a.p.		Rs a.p		Rs.a.p.		Rs.a.p.	M. s. c	Rs a. p	Rs. a. p.	M. s. c.	M. s. c.	Rs. a. p.
3	0 4 6	...	...	...	...	...	...	0 2 8	0 2 0	2 9 0	8 0 0	1 0 0	8 0 0
...	...	...	...	...	...	...	...	0 0 4	0 0 3	0 0 3	0 20 0	1 0 0	0 8 0
...	...	...	...	...	...	...	...	0 0 4	0 0 3	0 0 3	1 0 0	1 0 0	1 0 0
...	...	...	...	...	...	...	...	...	...	...	...	...	1 0 0
1	0 1 6	...	...	2	0 3 0	...	...	0 1 4	0 1 0	1 0 0	3 20 0	1 0 0	3 8 0
...	...	...	...	...	...	...	...	0 0 8	0 0 6	0 0 6	0 24 0	0 24 0	1 0 0
...	...	...	...	...	...	...	...	0 1 0	0 1 0	0 1 0	0 6 0	0 12 0	0 8 0
...	...	...	...	...	...	...	...	0 0 2	0 0 3	0 0 3	0 12 0	0 12 0	1 0 0
4	0 6 0	...	...	2	0 3 0	...	...	0 5 14	0 5 3	3 11 3	14 2 0	...	16 8 0
12	1 8 0	...	...	14	1 5 0	...	...	1 20 6	3 0 0	9 4 0	16 0 0	0 20 0	32 0 0
4	0 8 0	...	...	6	0 9 0	...	...	0 30 0	1 3 0	2 13 6	6 0 0	0 32 0	7 8 0
...	...	...	...	...	...	...	...	0 1 8	0 3 0	0 3 0	4 0 0	0 13 4	12 0 0
...	...	...	...	...	...	...	...	0 2 0	0 3 0	0 3 0	1 20 0	0 16 0	3 12 0
...	...	...	...	...	...	...	...	...	...	...	...	...	0 15 0
...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	0 12 0	...	...	20 0 0
...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	60	5 10 0	...	...	...	...	0 1 0	0 2 0	13 8 6	*0 5 0	...	22 8 0
...	...	...	...	...	...	...	...	...	...	...	1 20 0	1 15 0	4 0 0
...	...	...	...	...	...	...	...	0 1 4	0 0 7	0 0 7	3 9 6	1 0 0	3 0 0
...	...	...	...	...	...	...	...	...	...	...	...	...	0 12 0
16	2 0 0	60	5 10 0	20	1 14 0	...	...	2 15 12	4 11 7	26 12 7	32 0 0	...	106 7 0
...	...	...	...	...	1 14 0	8	0 12 0	2,000	2 8 0	10 4 0	†10 0 0	0 12 0	33 5 4
...	...	...	...	...	...	...	...	...	...	...	2 20 0	0 16 0	6 4 0
...	...	...	...	...	...	...	...	0 1 4	0 4 0	0 4 0	...	...	7 0 0
...	...	...	...	...	1 14 0	8	0 12 0	0 1 4	2 12 0	10 8 0	12 20 0	...	46 9 4
...	...	...	...	...	...	...	...	...	...	30 12 0	...	...	...
...	...	...	...	...	...	...	...	...	...	1 8 0	...	...	...
...	...	...	...	...	...	...	...	...	...	4 0 0	...	...	...
...	...	...	...	...	...	...	...	...	...	1 12 5	...	...	...
20	2 6 0	60	5 10 0	22	3 15 0	8	0 12 0	2 22 14	7 12 10	79 0 3	58 22 0	...	165 8 4
												Deduct total cost ...	79 0 3
												Balance of profit ...	90 8 1

* Opium at Rs. 4-8 per seer.
† Sugar.

77. A *Kurmi* is, next to the *Káchhi*, the best cultivator in this district; he farms on a broader scale, but in devotion to his land and industry, both of himself and of his entire family, he rivals the more closely working market gardener. Take a *Kurmi* with a wife and three boys aged 8, 10, and 12 respectively, with one pair of plough bullocks and fifteen bíghas of land. His agricultural operations will be as follows:—In *Jeṭh* he will prepare (by watering) a field to be sown with indigo, for *seed*, not plant. He will hire a man to help, and as the field is very dry it will take five days to water; meanwhile three labourers will plough his field. He must also water the cane, taking four days, and dig it up (*guṛai*) with the *kudár*, hiring three men to help. The indigo is then watered, taking five days, and again the cane, taking four, which will then be weeded by ten labourers. Another watering will be given to the indigo, and then it will be weeded, eight men being hired to help, and a third watering given the cane, after which the man and his son will bring mud in a cart from the pond and throw it on the cane field: this will take two days, and two men will be hired to assist in putting the mud at the root of each plant. Now to manure the maize field with one cartload (20 maunds) of stable refuse, the hire of the cart being two annas, the man himself will spread the manure in a day; when the rain falls he will plough the field for maize for two days, and the son and four labourers will weed the indigo; after which he, his son, and labourer will sow the maize up to noon, cleaning the field for the rest of the day. He will then plough for cotton and sow it the next day himself, and when this is done, plough for and sow his *juár* (three bíghas), in all four days. He is now at liberty to commence ploughing his rabi fields: after giving them one ploughing he will plough for his *bájra*, and weed his cotton, hiring two men for two days, and his maize, hiring four men for two days, and his cane, hiring two men for two days, and his indigo, hiring ten men for one day. *Sáwan* has now arrived, and he gives the *rabi* fields another ploughing, after which he sows his *bájra*, cleans the field, and then for three days weeds his *juár* with eight hired men. Again he ploughs his *rabi* fields and weeds his maize with four hired men for two days, and then his cotton with six men for two days. *Bhádon* has now commenced, the *rabi* fields are again ploughed, and the maize weeded and the roots strengthened with earth heaped up round them, four men being hired to assist. Again the cotton is weeded and the *rabi* fields ploughed, and the *bájra* weeded by ten men, taking two days. After another ploughing for *rabi*, the *juár* is thinned in two days and the indigo cut by his family and three hired men, and the cultivator himself. Suppose it to rain for three days and *Kuár* is come, then there are three things to be done—to watch the maize, plough the *rabi*, and collect fodder for the cattle. The first is done by a hired man, costing Rs. 2-5-6 a month; the second by the cultivator

Kurmi.

himself; the third by the oldest boy. Towards the end of *Kwár* the *kákun* and maize will be cut, the cobs separated from the stalks, five men being hired to help, and the maize field will then be cleared, "bhutái karná," for *rabi* and ploughed. The hired man must be kept on to watch the *jwár* and *bájra*, and the cultivator, helped by another man, sows his rabi (one bígha wheat, three bighas *bijhra*, including the *dofasli* field, two bíghas *jau-chana*) in four days, levels the fields himself and with a man to help for two days, makes the irrigation beds and channels, after which he waters his cane. Hiring three men, he now cuts indigo seed and stores it on the threshingfloor, and then brings in the *urd* and *til* from the *jwár*, and the *múng* from the *bájra*, in all seven days; and then by beating separates the seed pods of the indigo (he has a man to assist him all this time). The *bájra* is now cut, and afterwards the *jwár*, by men taking their wages in kind (*lonhári*). Then the indigo seed, *bájra*, and *jwár*, are threshed out and winnowed, taking, say, a week; and as it is now *Aghan*, the well is put in repair (see "Well") and the housewife, helped by other women (paid by eleventh share), begins to pick the cotton. The cultivator sets to work to water his *rabi* with help: it will take twenty days to water his wheat and *bijhra* (*jau-chana* will remain unirrigated), after which the cane is watered, and the wheat and *bijhra* weeded, five hired men helping, and the job taking four days. In *Pús* the *rabi* is again watered and preparations made for pressing out the sugar; the mill fixed in the ground and the boiling house covered in. The wheat is then watered again, taking four days, and the cane cut and pressed (see "Cane"), taking eight days, after which there is nothing to do for nearly three weeks, when the wheat must be watered yet once more, and preparations made to sow next year's cane. When *Chait* has come, after the *Holi*, the family will cut the wheat in three days, the *bijhra* in nine days, the *jau-chana* in six days, and the *arhar* in two days more, and bring the whole to the threshingfloor, where they will thresh it out at their leisure, taking perhaps six weeks to do it; preparing the field in the meanwhile for next year's crop of cane. Thus the year has gone round, and it is *Jeth* again.

Statement showing agricultural

1.	2.	3.		4.		5.		6.		7.		8.	
Name of crop.	Area sown in 1 bigha (⅘ acre.)	*Sowing.*		*Manure.*		*Weeding.*		*Watering.*		*Watching.*		*Making irrigation beds.*	
		Number of men.	Wages.	Number of men.	Cost.	Number of men.	Wages.	Number of men.	Wages.	Number of men.	Wages.	Number of men.	Wages.
			Rs.a.p.				Rs. a. p				Rs.a.p		
Indigo	1	..	...	...	...	41	3 3 6	...	...	...	...	...	...
Ditto seed	...	...	...	...	...	...	...	...	...	...	...	...	...
Ditto stalks ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cotton	1	...	...	...	...	28	2 3 0	...	...	...	...	...	...
Indian-corn	1	1	0 1 3	...	0 2 0	20	1 9 0	...	...	1	0 10 0	...	...
Jwár ...													
Kakun ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Phút ...	...	...	...	..	...	...	...	...	...	...	...	...	...
Jwár	3	...	..	.	...	24	1 14 0	...	...	...	...	...	...
Urd	...	...	...	...	...	...	...	...	...	...	...	...	...
Hemp	...	...	...	...	...	...	...	...	...	...	...	...	...
Til	...	...	...	...	...	...	...	...	...	...	...	...	...
Bájra	3	...	...	...	...	20	1 9 0	...	...	...	...	...	...
Total Kharíf ...	9	1	0 1 3	...	0 2 0	133	10 6 6	..	...	1	0 10 0	...	...
Cane	1	7	0 11 9	...	1 12 0	26	2 0 6	...	...	...	...	...	...
Rab	...	...	...		...	...	...	...	...	...	...	...	...
Melon	...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	1	7	0 11 9	...	1 12 0	26	2 0 6	...	...	...	...	...	...
Wheat	1	1	0 1 3	...	...	5	0 6 0	...	...	..	...	...	...
Bijhra (in maize field) ...	2	6	0 7 6	...	...	15	1 2 9	...	...	...	...	...	...
Jau-chána	2	1	0 1 3	...	...	...	...	...	...	...	...	...	...
Arhar	...	...	...	...	...	...	...	...	...	..	...	...	...
Ditto stalks, &c. ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sarson	...	...	...	...	...	...	...	...	...	...	...	...	...
Andí (castor oil) ...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ditto (ditto plant) ...	...	..	...	...	...	...	...	...	...	...	...	...	...
Total ...	5	8	10 0	...	...	20	1 8 9	...	...	...	...	...	...
Rent	...	...	...	...	...	...	...	...	...	...	...	...	...
Share of cost of well ...	...	...	...	...	...	...	...	..	...	...	...	...	...
Share of cost of well gear,	...	...	...	...	...	...	...	...	...	..	...	...	...
Share of cost of mill ...	...	...	...	...	...	...	...	...	...	...	...	...	...
GRAND TOTAL ...	15	16	1 7 0	..	1 14 0	179	13 15 9	...	...	1	0 10 0	...	...

		Rate. Rs. a. p.	*Rent.* Rs. a. p.
Detail of holding ...	*Gauhán* 4 bighas wet	.. 5 0 0	20 0 0
	Manjha 5 „ „	.. 3 8 0	17 8 0
	Barhet 6 „ dry	.. 1 12 0	10 8 0

operations of a Kurmi *cultivator.*

9. *Cutting.*		10. *Collecting.*		11. *Winnowing and threshing, &c.*		12. *Constructing wall of protection.*		13. *Seed.*		14.	15.	16.	17.
Number of men.	Wages.	Number of men.	Wages.	Number of men.	Wages.	Number of men.	Wages.	Amount.	Price.	Total cost.	Produce.	Price per rupee.	Total value.
	Rs.a.p.				Rs.a.p.			M. s. c.	Rs. a. p.	Rs. a. p.	M. s. c.	M. s. c.	Rs. a. p.
9	0 11 3	...	...	...	...	...	...	0 4 0	0 11 0	4 9 9	25 0 0	5 0 0	5 0 0
...	...	...	...	...	...	...	...	...	...	...	3 0 0	0 6 11	18 0 0
...	...	...	...	...	...	...	...	...	...	...	...	...	0 10 0
...	1 0 0	...	...	...	...	...	...	0 2 8	0 1 3	3 4 3	2 0 0	0 7 0	11 8 0
5	0 6 3	...	...	...	...	...	...	0 2 8	0 2 0	2 14 6	8 0 0	1 0 0	8 0 0
...	...	...	...	...	...	...	...	0 0 8	0 0 6	0 0 6	1 20 0	1 0 0	1 8 0
...	...	...	...	...	...	...	...	...	...	...	...	...	1 0 0
4	0 5 0	...	...	...	...	...	...	0 3 12	0 3 0	2 6 0	10 20 0	1 0 0	10 8 0
...	...	...	...	...	...	...	...	...	...	...	1 37 0	0 24 0	3 3 3
...	...	...	...	...	...	...	...	0 3 10	0 4 3	0 4 3	0 10 0	0 12 0	0 13 0
...	...	...	...	...	...	...	...	...	...	...	1 11 0	0 12 0	4 4 0
2	0 2 6	...	...	...	...	...	...	0 3 0	0 3 0	1 14 6	9 0 0	0 30 0	12 0 0
20	2 9 0	...	...	...	...	...	...	0 19 14	1 9 0	15 5 9	62 18 0	...	76 6 3
...	...	...	...	..	1 14 0	...	...	2,000	2 8 0	8 14 3	10 0 0	0 12 0	33 5 4
...	...	...	...	...	...	...	...	...	...	...	2 20 0	0 16 0	6 4 0
...	...	...	...	..	...	...	...	0 1 4	0 4 0	0 4 0	...	...	10 0 0
...	...	...	...	..	1 14 0	...	...	0 1 4	2 12 0	9 2 3	12 20 0	...	49 9 4
...	...	...	...	...	...	...	...	0 30 0	1 8 0	1 15 3	8 0 0	0 20 0	16 0 0
...	...	...	...	...	...	...	...	2 10 0	3 10 0	5 4 3	22 0 0	0 32 0	27 8 0
...	...	...	...	...	...	...	...	1 20 0	2 6 0	2 7 3	10 0 0	0 32 0	12 8 0
...	...	...	...	...	...	...	...	0 7 12	0 3 10	0 3 10	12 0 0	1 0 0	12 0 0
...	...	...	...	...	...	...	...	...	...	...	...	...	3 0 0
...	...	...	...	...	...	...	...	0 3 0	0 6 0	0 6 0	7 20 0	0 13 4	22 8 0
...	...	...	...	...	...	...	...	0 3 0	0 4 6	0 4 6	2 0 0	0 16 0	5 0 0
...	...	...	...	...	...	...	...	...	...	...	...	...	1 7 0
...	...	...	...	...	...	...	...	4 33 12	8 6 4	10 9 1	61 20 0	...	99 15 9
...	...	...	...	...	...	...	...	...	...	48 0 0			
...	...	...	...	...	...	...	...	...	...	1 8 0			
...	...	...	...	...	...	...	...	...	...	4 0 0			
...	...	...	...	...	...	...	...	...	...	1 12 5			
20	2 9 0	...	...	...	1 14 0	...	...	5 14 14	12 11 4	90 5 6	136 18 0	...	225 14 7
										Deduct total cost ...			90 5 6
										Balance of profit ...			135 9 1

78. It is not out of place to briefly describe what such a cultivator wears, what he owns in the way of pots and pans or jewellery, and where he lives. The following details are the result of constant enquiry, and may be accepted as approximate to actual fact.

79. The cultivator will want for himself a pair of waistcloths *(dhoti)* costing Re. 1-8-0, a couple of *pagris (angochha)* costing 6 annas, a jacket *(mirzai)* costing for the hot weather 5 annas, and a stuffed one for the cold weather costing 14 annas. Over his shoulders he will throw a cloth *(pichhaura)* costing 12 annas, and if he is well up in the social scale he will have a coat *(angarkha)* costing 13 annas. These will chiefly be made of country cloth, but a considerable proportion is of Manchester goods. He will also buy a pair of shoes, costing 8 annas. His wife will want a petticoat *(lahnga)* costing Re. 1, a shawl *(lugra* or *dopatta)* costing 8 annas, and a jacket *(jhola)* costing 4 annas, and a small *dhoti* costing 8 annas. These are nearly entirely made of country cloth.

80. The children rarely come in for new clothes; when they wear any at all, the cast-off garments of their parents do duty for them. In the cold weather a couple of blankets must be bought, or quilted coverlets (*galef* or *razái*) made of purchased cloths stuffed with the cultivator's own cotton.

81. The total cost of clothes for a family of five will amount to about Rs. 15, and the proportionate annual expenditure to about Rs. 10-8-0.

82. The following abstract of enquiries made by me is interesting, as giving the grounds of the above details :—

Class.	Number of persons enquired from.	Number of men in family.	Number of women in family.	Number of boys in family.	Number of girls in family.	*Dhoti* OR WAISTCLOTH.				*Angochha* OR *Pagri*.				*Pichhaura* CLOTH.				*Mirzai* AND *Kurta* OR JACKET.			
						Number.		Average cost.		Number.		Average cost.		Number.		Average cost.		Number.		Average cost.	
						Country-made.	English-made.	Country-made.	English-made.	Country-made.	English-made.	Country-made.	English-made.	Country-made.	English-made.	Country-made.	English-made.	Country-made.	English-made.	Country-made.	English-made.
								Rs. a. p.	Rs. a. p.			Rs. a. p.	Rs. a. p.			Rs. a. p.	Rs. a. p.			Rs. a. p.	Rs. a. p.
Middle...	235	635	514	339	247	822	231	0 11 7	0 13 11	594	23	0 2 7	0 4 2	399	15	0 10 7	1 3 4	427	146	0 7 11	0 11 0
Lower ...	121	306	259	144	108	454	68	0 10 11	0 14 9	290	2	0 2 7	0 10 0	155	4	0 10 6	0 14 4	203	38	0 7 10	0 11 7
Total ...	356	941	773	483	355	1276	299	0 11 4	0 14 1	884	25	0 2 7	0 4 8	554	19	0 10 6	1 2 3	630	184	0 7 11	0 10 10

Class.	Number of persons enquired from.	Number of men in family.	Number of women in family.	Number of boys in family.	Number of girls in family.	*Gelef* AND *Razái* OR QUILT.				*Lahnga* OR PETTICOAT.				*Lugra* OR SHAWL.				*Jhola* OR JACKET.				Annual average expenditure per head.
						Number.		Average cost.		Number.		Average cost.		Number.		Average cost.		Number.		Average cost.		
						Country-made.	English-made.	Country-made.	English-made.	Country-made.	English-made.	Country-made.	English-made.	Country-made.	English-made.	Country-made.	English-made.	Country-made.	English-made.	Country-made.	English-made.	
								Rs. a. p.	Rs. a. p.			Rs. a. p.	Rs. a. p.			Rs. a. p.	Rs. a. p.			Rs. a. p.	Rs. a. p.	Rs. a. p.
Middle...	235	635	514	339	247	328	18	7 4 2	3 0	482	21	4 11 5	0 8	460	28	3 0 7	1 5 1	239	18	4 0 0	5 1 1	11 11 6
Lower ...	121	306	259	144	108	152	...	4 8	...	264	...	3 11	...	253	3	7 4 0	13 8	128	10	3 4 0	4 3 1	9 11
Total...	356	941	773	483	355	480	18	6 2 3	4 3 0	746	21	4 6 5	0 7	713	31	9 7 9	1 4 1	367	19	3 9 0	5 6 0	10 11

83. In his house the cultivator must have—

	Rs.	a.	p.
1 *Karhái*, iron pot, costing	... 2	0	0
1 *Kálchhul*, iron spoon	... 0	3	0
1 *Táwá*, iron plate on which the "chapáti" is cooked over the "chulá" ...	... 0	8	0
1 *Batloi*, brass cooking vessel about 6 lbs. in weight	... 3	0	0
3 *Lotá*, brass drinking vessel	... 2	15	0
2 *Táthi* or *thálí*, flat brass dishes	... 2	2	0
1 *Kathothi*, large wooden dish (deep) for kneading, &c.	... 0	6	0
2 *Katheli*, small wooden dishes for scraps, &c. The above will last 6 to 10 years	... 0	2	0
24 *Gharas*, *hándis*, earthen pots	...	...	
1 *Chalní*, sieve	... 0	1	0
1 *Súp*, grain-cleaner (of *sirki*)	... 0	0	6
1 *Músal*, pestle of heavy wood, such as *babúl*, *sisam*...	... 0	7	0
1 *Chakki*, stone hand-mill (both stones included)	... 0	12	0
1 *Silwat*, stone on which condiments are ground 1 *Luṛhwá*, stone with which ditto ditto }	... 0	8	0
1 *Tarázu*, scales of *arhar* stalks	... 0	2	0
1 *Dholak*, drum for amusement	... 0	4	0
1 *Chárpái*, bed (string and all)	... 0	8	0
1 *Khaṭola*, cot	... 0	4	0

84. He will eat maize-flour in September and October, *jwár* from November to March, and from March to September again *bijhra*. For a family of five 36 maunds grain will be required, costing, say, Rs. 36, to which must be added 1lb. pulse (*dál*) and 2 ozs. salt per diem, costing altogether Rs. 11-4-0. He will vary his diet with vegetables or richer cakes on festivals, for which another rupee or two must be allowed.

85. These exemplars are the result of constant enquiry ; every point has been discussed over and over again with cultivators ; I am not even now satisfied that the minimum cash expenditure has been reached; I am confident that more use is made of the labour of the wife and younger children than I can get admitted ; but they are approximately true, and show what profit in an ordinary year a cultivator may look for. It is nothing great certainly even then, but it must be often exceeded, or whence does he get the money for masonry wells, for weddings, &c. And it need hardly be stated that the cultivator has not to look for cash; he can eat the grain, cheap or dear, he has himself raised. On the question of his indebtedness I touch in a later paragraph; but I think the foregoing exemplars show that the condition of the cultivator need not be the one of abject misery it is so often represented. It is true his life is one of almost uninterrupted toil from year's end to year's end, but let him alone, and he is happy. He has not as yet the intelligence or education to make him aspire to better things. Can we not all say that where he has, he comes out of the ruck, adds bígha to bígha, rupee to rupee (unfortunately too often by lending to his less thrifty brethren), and dies perhaps the proprietor of a snug little

estate, which his son will either enlarge or dissipate according as he inherits his father's good qualities, or is corrupted by the surroundings which a well-to-do lad is too often brought up in ?

86. The subject of the relation of the cultivator to the money-lender is perhaps the one most constantly discussed in any paper dealing with agriculture in India. As a rule, the ryot is pictured as hopelessly in the grasp of a merciless creditor who takes the entire result of his labour, and barely doles him out sufficient to keep body and soul together, and that only as long as there is any prospect of more being got out of him.

87. I am not prepared to say that up to a certain point this is not true. A large proportion of the cultivators are in debt, some hopelessly, but many only from year to year. There are many who do not remember the commencement of their indebtedness, and cannot say how much they now owe. There are many more who borrow, it is true, year by year, but they punctually pay, and can state within a few annas the amount against them in the banker's books. There are a very large number who do not owe a pice.

88. I have made extensive enquiries on this subject, and have had the results tabulated. I do not pretend to say that the statements made are absolutely and beyond doubt trustworthy, but every possible care has been taken to obtain correct answers. I have, as far as possible, verified the statements myself from the banker's books, and rarely found discrepancies. I have myself enquired minutely into the circumstances of the person questioned, and, as far as possible, made him give a reason for every statement made (*e.g.*, I have made him give the details of his cultivation, why he wanted money, and so forth); where there has been the least suspicion that a body of ryots have been, for any reason, foisting on me a ready-made tale, I have rejected their statements. Though I am aware how little reliance is or can be placed on Indian statistics, I only submit that these are as trustworthy as care in their compilation could make them:—

Statistics of indebtedness.

Name of pargana.	Number of men from whom enquiries were made.	Never in debt.	*In debt.*									Total.
			For one year.	Two years.	Three years.	Four years.	Five years.	Ten years.	Fifteen years.	Twenty years.	Always.	
Akbarpur ...	2,123	572	107	135	139	185	116	438	149	128	154	1,551
Percentage...	...	26·9	5·0	6 3	6·5	8·7	5·4	20·6	7·0	6·0	7·2	73 0
Ghátampur ...	2,500	1,188	206	138	151	135	104	309	114	61	94	1,312
Percentage...	...	47·5	8 2	5·5	6·0	5·4	4·1	12·3	4·5	2·4	3·7	52 5

Object of first loan taken.

Name of pargana.	Rent.	Expenses of cultivation or sowings.	Plough cattle and implements.	Food.	Wedding and other ceremonies.	Unknown.
Akbarpur	611	130	595	72	47	96
Percentage	39·4	8·3	38·4	4·6	3·0	6·2
Ghátampur	199	225	516	129	93	150
Percentage...	15·1	17·1	39 3	9 8	7·1	11·4

These men paid their *kharif* rent as follows :—

Name of pargana.	From produce.	Produce and loan.	Loan or other sources.	Loan only.	Other sources.	Other sources and loans.	Produce loans and other sources.	Balance.
Akbarpur ...	655	377	162	632	196	13	12	76
Percentage ...	30·9	17·7	7·6	29·7	9·2	0·6	0 5	3 5
Ghátampur ...	1,818	67	64	455	37	5	1	53
Percentage ...	72·7	2 7	2 5	18·2	1·4	0·2	0·0	2·1

Their *rabi* rent as follows :—

Name of pargana.	From produce.	Produce and loan.	Loan and other sources.	Loan only.	Other sources.	Other sources and loans.	Produce, loans, and other sources.	Balance.
Akbarpur ...	1,083	215	74	627	83	3	6	32
Percentage ...	51·0	10·1	3·4	29 5	3·9	0·1	0·2	1·5
Ghátampur ...	1,824	34	77	428	37	3	12	85
Percentage ...	72·9	1·3	3·0	17·1	1·4	0·1	0·4	3·4

Purchased their seed as follows :-

Name of pargana.	From produce.	Produce and loan.	Loan and other sources.	Loan only.	Other sources.	Other sources and loan.	Produce, loans, and other sources.	Balance.
Akbarpur ...	481	755	200	309	22	346	5	5
Percentage ...	22·6	35·6	9 4	14·5	1·0	16·2	0·2	0·2
Ghátampur ...	1,292	25	4	1,091	18	4	...	66
Percentage ...	51·6	1·0	0·1	43·6	0·7	0·1	...	2·6

And supported themselves thus:—

Name of pargana.	From produce.	Produce and loan.	Loan and other sources.	Loan only.	Other sources.	Other sources and loans.	Produce, loans, and other sources.	Balance.
Akbarpur ...	473	494	226	606	235	76	13	...
Percentage ...	22·2	23·2	10·6	28·5	11·0	3·5	0·6	...
Jhátampur ...	1,105	324	220	608	164	42	12	25
Percentage ...	44·2	12·9	8·8	24·3	6·5	1·6	0·4	1·0

90. Nor is the relation of the money-lender and ryot all on one side. Why is it that such enormous interest is required? It is simply that the security on which an advance is made is almost *nil*. The crops are hypothecated for the rent, and as every English trader knows, as well as the village banker, a decree of the civil court results in a "charpai and a lota" only representing the movable property of the judgment-debtor. I give here two genuine extracts from a banker's book, which show that though it is true the whole of the supposed produce of the ryot went to the banker, the banker has been (as in numberless instances he is) a loser in the end.

Banking account of Konrowá Chamár of Hathirwá, holding 17 *bighas at Rs.* 34-8-0.

Dr.					Cr.				
Year.	Debit.	Rs.	a.	p.	Year.	Credit.	Rs.	a.	p.
1920...	Balance brought over,	183	7	3	1920...	*Bijhra* 42½ mds., after deducting 8¾ mds., @ 29 seers.	59	0	0
	Cash ...	1	0	0		*Arhar* 6 mds., @ 35 seers ...	6	11	9
	Interest ...	34	8	9		*Gram* 1¾ md., @ 27 „ ...	2	15	6
	For rent ...	14	0	0		Cash	38	0	0
	Grain 8¾ mds. for 7 maunds.	...							
1921...	Balance brought over,	125	0	0	1921..	*Nil*	...		
	Cash ...	39	7	0					
	Interest, *Kátik* ...	30	13	6					
	Food ...	19	14	0					
	Rent ...	14	0	0					
	Food ...	5	0	0					
	Interest, *Chait* ...	42	15	0					
	Rent ...	14	0	0					
1922..	Balance brought over,	291	1	6	1922..	*Jwár* 13½ mds., @ 23 seers...	23	5	3
	Food ...	29	0	0		*Bájra* 4½ „ @ 25 „ ...	7	3	0
	Seed ...	22	13	6		*Urd* 1¾ „ @ 15½ „ ...	4	10	6
	Interest, *Kátik* ...	58	8	0		*Til* 1 „ @ 16¼ „ ...	2	12	0
	Rent ...	20	14	6		Cash	0	5	0
	Interest, *Chait* ...	69	2	0		*Bijhra* 17½ „ @ 20 „ ...	34	8	0
	Rent ...	30	9	0		*Arhar* 5 „ @ 21 „ ...	9	8	0
	Kist ...	14	0	0		Gram 4½ „ @ 20 „ ...	9	1	0
						Wheat 6¾ „ @ 14 „ ...	19	5	6
						Cash	14	12	9

Banking account of Konr owá Chamár of Hathirud, holding 17 bighas at Rs. 34-8-0—(continued.)

Dr.						Cr.			
Year.	Debit.	Rs.	a.	p.	Year.	Credit.	Rs.	a.	p.
1923...	Balance brought over,	408	9	6	1923...	*Urd* 9½ mds. @ 20½ seers...	18	8	0
	For cattle ...	15	8	0		*Jwár* 5¾ „ @ 24 „ ...	9	9	0
	Food ...	31	12	0		*Bájra* @ ...	6	10	9
	Interest, *Kátik* ...	85	8	0		Cash	4	0	0
	Seed ...	35	0	0		*Bijhra* 12 mds. 5½ srs. @ 24 srs.	20	3	6
	Rent ...	10	1	6		Gram 7 „ 17 „ @ „	12	6	0
	Kist ...	14	0	0		Wheat 21 „ 3 „ @ 16½ „	50	12	6
	Interest, *Chait* ...	105	3	0		*Arhar* 6 „ @ 28 seers ...	8	9	0
	Kist ...	14	0	0		Cash	2	10	0
	Rent ...	27	0	0					
1924...	Balance brought over,	613	5	3					
	Account closed.								
1926...	Balance of former years '23 '24 '25.	300	3	9	1926...	*Bijhra* 38 mds. 25 srs. @ 21 srs.	71	14	0
						Arhar 7 „ „ @ 26 srs.	10	12	3
	Interest, *Kátik* ...	56	4	0					
	Rent ...	35	1	0					
1927...	Balance brought over,	308	14	6	1927...	Cash	16	0	0
	Food ...	11	0	0		*Bijhra* 32 mds. 37½ srs. @ 34 srs.	38	12	0
	Cash ...	16	0	0		Wheat 13½ mds. @ 26 srs. ...	20	6	0
	Interest, *Kátik* ...	25	8	0		*Arhar* 12 „ @ 1 md. ..	12	0	0
	Seed ...	39	3	6		Gram 1 md. 25 srs. @ 32 srs.	2	0	6
	Interest, *Chait* ...	74	11	6					
	Rent ...	36	14	6					
	Kist ...	28	0	0					
1928...	Balance brought over,	451	1	6	1928...	Cash	41	0	9
	Interest ...	82	11	0		*Bijhra*, 1 md. 15 srs, @ 30 srs.	1	5	0
	Kist ...	14	0	0		*Arhar*, 7⅜ mds. @ 30 seers ...	10	6	0
	Interest ...	98	9	0		*Gujai*, 4¼ „ @ „ ...	5	10	0
	Kist ...	4	0	0					
	Rent ...	55	10	6					
	Buffalo ...	26	0	0					
	Interest ...	4	11	0					
	Food ...	2	12	0					
1929...	Balance brought over,	671	1	3	1929...	Cash	8	5	0
	Interest, *Kátik* ...	119	9	0					
	Do. *Chait* ...	141	14	0					
1930...	Balance brought over,	924	3	3	1930...	Cash	1	0	0
						Bijhra 10 mds. @ 20 seers...	20	0	0
	Account closed.					Gram 3 mds. 25 srs. @ 20 srs.	7	4	0
	Balance account ...	22	13	3					
	Food ...	21	11	0					
	Interest, *Kátik* ...	4	2	0					
	Do., *Chait* ...	4	3	6					
	Seed ...	17	11	9					
	Interest, *Chait* ...	13	2	0					
	Rent ...	9	2	0					
1931...	Balance brought over,	64	13	3	1931...	Cash	9	8	0
	Interest, *Kátik* ...	12	0	0					
	Do., *Chait* ...	14	4	0					
	Rent	26	10	6					
1932...	Balance brought over,	108	3	9					
	Food	11	12	6					
	Abstract of above.								
	Rent	268	5	0		Value of grain and cash ...	652	14	3
	Cash and *kists* ...	444	10	9					
	Seed	113	12	9					
	Cattle	41	8	0					
	Food	155	11	3					
		1,023	15	9					
	Interest ...	1,078	3	3					
	Not known... 91210 ...	210	1	9					

Banker's book of Maddri Singh Thákur of Hathiruá, cultivating 9 bighas at Rs. 13-7-6.

Year.	Debit.	Rs.	a.	p.	Year.	Credit.	Rs.	a.	p.
1920...	Cash	27	0	0	1920...	Cash	7	0	0
	Ditto	0	8	0		*Urd*, @ 26 seers ...	1	0	0
	Food	5	0	0		Wheat, 15 maunds, @ 22 seers	27	12	0
	Interest, *Chait* ...	3	10	0		*Arhar*, 6¼ ,, @ 35 ,,	7	2	3
	Advanced for rent	25	2	3		*Bijhra*, 13½ ,, @ 19 ,,	18	10	0
1921...	Balance carried over ...								
	Cash	3	0	0	1921...	Cash	5	0	0
	Interest, *Kátik* ...	1	11	0					
	For seed ...	4	0	0					
	Food	3	2	0					
	For weeding ...	2	0	0					
	Cash	3	0	0					
	Food	2	0	0					
	Do.	3	0	0					
	Interest, *Chait* ...	2	9	6					
1922...	Balance brought over	19	7	6	1922...	*Bájra*, 4 mds. 15 srs. @ 25 srs.	7	0	0
	Food	10	0	0		*Jwár*, 4¼ maunds, @ 24 seers.	7	1	3
	Seed	12	10	0		*Urd*, 2½ ,, @ 17 ,,	6	1	0
	Interest, ½ *Kátik* ...	4	15	6		Cash	2	0	0
	Cash for bhúsa ...	1	4	0		Gram, 2½ maunds, at 20 srs.	5	0	0
	For rent ...	8	8	0		*Bijhra*, 14¼ ,, @ 20 ,,	22	8	0
	Interest, 2nd half *Chait*	6	7	6					
	Rent	5	0	0					
1923...	Balance brought over	18	10	3	1923...	*Urd*, 4 maunds, @ 20½ seers	7	11	0
	Food	15	0	0		Cash	10	0	0
	Interest, *Kátik* ...	5	3	6		*Bijhra*, 17 mds 8¾ srs, @ 24 srs.	28	11	0
	Seed	15	8	0		Wheat, 8 ,, 10 ,, @ 16½ ,,	20	0	0
	Cash	1	0	0		Gram 4 ,, @ 24 seers ...	6	10	9
	Interest, *Chait* ...	6	10	6		*Arhar*, 1 ,, 2 srs., @ 28 srs.	1	8	0
	Rent	7	8	0		Cash	0	6	0
	For an old debt ...	30	0	0					
	3 maunds *bijhra* to be paid 3 maunds 36 seers.	...							
1924...	Balance brought over	22	1	6	1924...	*Bijhra*, 1 md. 15 srs., @ 34 srs.	1	9	6
	Food	7	0	0		Wheat, 7 ,, @ 24 seers ...	11	11	6
	Interest, *Kátik* ...	5	7	0		*Arhar*, 7 ,, @ 45 ,, ...	5	14	0
	Seed	12	15	6		Gram, 1 ,, 35 srs., @ 36 srs.	2	3	3
	Rent	11	10	0		Cash	2	0	0
	Interest, 2nd half *Chait*	8	14	6					
1925...	Balance brought over	44	11	0	1925...	*Bijhra*, 20½ mds, @ 19 seers ..	43	2	6
	For cattle ...	8	0	0		*Arhar*, 3 ,, @ 20 ,, ...	6	0	0
	Food	7	0	0					
	Ditto	3	0	0					
	Interest, *Kátik* ...	11	12	0					
	Seed	15	0	0					
	Rent	2	7	0					
	Interest, *Chait* ...	17	3	3					
	Rent	10	10	0					
	Bijhra 1 maund to be paid 1½ maund.	...							
1926...	Balance brought over	70	9	3	1926...	*Bijhra*, 5 mds. 4 srs., @ 17 srs.	12	0	0
	Food	10	0	0		*Urd*, 3 mds. 20 srs., @ 14 ,,	10	0	0
	Interest, *Kátik* ...	14	9	0		*Múng*, 20 srs., @ 16½ srs. ...	1	2	9
	Seed	19	1	3		*Jwár*, 4½ mds., @ 20 ,, ...	9	0	0
	Cash	2	6	0		Cash	1	0	0
	Rent	10	10	0		*Bijhra*, 22 mds 20 srs., @ 21½ srs	41	14	0
	Interest, *Chait* ...	17	10	0		*Arhar*, 1 md. 25 srs., @ 26 srs.	2	8	0
	Rent	13	13	0					

Banker's book of Madári Singh Thákur of Hathirwá, cultivating 9 bighas at Rs. 13-7-6—(concluded).

Year.	Debit.	Rs.	a.	p.	Year.	Credit.	Rs.	a.	p.
1927...	Balance brought over	81	1	9	1927	*Urd*, 30 srs., at 20 srs. ...	1	8	0
	Food	7	7	0		*Bijhra*, 12 mds. 5 srs., at 24 srs	14	4	0
	Interest to *Kátik* ...	16	8	0		Wheat, 7 „ 25 „ at 26 „	11	13	3
	Seed	13	3	0		Gram, 25 srs., at 32 srs. ...	0	12	6
	Interest to *Chait* ...	21	12	0		*Arhar*, 4 mds. 20 srs., at 1 md.	4	8	0
	Rent	13	10	9					
1928...	Balance brought over	120	4	3	1928	*Bijhra*, 6 mds 5 srs., at 30 srs.	8	3	0
	Cash	2	8	6		*Arhar*, 7 „ 10 „ at 30 „	9	10	0
	Interest to *Kátik* ...	14	0	0		Cash	3	0	0
	Ditto *Chait* ...	26	3	0					
	Cash	4	12	0					
	Rent	19	0	0					
1929...	Balance brought over	166	2	9	1929	*Bijhra*, 7 mds. 3 srs., @ 24 srs.	12	14	6
	Interest to *Kátik* ...	31	2	0		Gram, 4 „ 15 „ @ 24 „	7	4	9
	Ditto *Chait* ...	36	15	0		*Arhar*, 1 „ 15 „ @ 27 „	2	0	0
	Cash	2	12	0		Wheat, 4 „ 9 „ @ 15½ „	11	10	3
	Rent	18	0	0		Cash ...	2	0	0
1930...	Balance brought over	219	1	9	1930	*Bijhra*, 7 mds. 10 srs., @ 20 srs.	14	8	0
	Interest to *Kátik* ...	37	8	0		Gram, 3 „ @ 20 srs.	6	0	0
	Ditto *Chait* ...	37	8	0		Cash ...	11	0	0
	Food	18	8	0					
	Seed	15	8	3					
	Interest to *Kátik* ...	3	7	0					
	Ditto *Chait* ...	5	10	0					
	Rent	15	0	0					
1931...	Balance brought over	321	11	3	1931				
	Interest to *Katik* ...	58	5	0					
	Ditto *Chait* ...	58	5	0					
	Rent and food ...	26	6	2					
1932...	Balance brought over	464	7	9					
	Food and seed ...	18	10	0					
	Abstract of above.								
	Rent	187	0	6		Value of grain, &c., repaid...	462	3	3
	Cash	21	2	6					
	Seed	107	11	3					
	Food	110	11	0					
	Weeding ...	1	0	0					
	Cattle	8	0	0					
	Old debts ...	57	0	0					
	Interest ...	492	9	3					
		453	14	3					

90. These are not isolated instances; over and over again the cultivator absconds, leaving his banker unpaid. I do not say that the money-lender is not oppressive in the rates of interest he takes, nor that he does not take all he can get out of his debtor; but I do say that without the banker the agriculture of the country could not proceed, any more than it does in England without banks supported by and supporting the agricultural interest there. I say that the cultivator is generally thriftless and improvident, spending any extra receipts he may have in weddings, and often to the deliberate defrauding of his creditor; and where he is not so improvident, he is, as so many are, not in debt to any man, and gradually becoming a substantial man. In a profession so greatly dependent on the chance of a season or some convulsion of society, it would be strange were we to find every year as profitable as the last, or the careless improvident cultivator as prosperous as his thrifty brother. But at any rate he has now every chance of keeping his head above water; he is not, under the new distribution of instalments, called upon to pay his rent when he has not touched one pice of the produce of his field. This relief, so strongly combated by money-lending zamindárs, does not, strange to say, entirely recommend itself to certain minds even yet, but it seems to me unjust to deliberately force a man to borrow, and then turn round on those who lend and call them extortioners, &c., whilst the miserable state of the cultivator, forced into debt by our system of collection, is quoted to excite commiseration, and to form the basis of attacks on the system of settlement.

91. The following are the usual forms of money transactions between the cultivator and his banker:—

Siwái.—If the ryot takes grain in *Kátik* he returns five-fourths in *Jeṭh* in grain or money value, that is, the amount of grain due is converted into its money value in *Kátik* (when it is dear), and in *Jeṭh*, when grain is cheap, the money due, enhanced one-fourth, is reconverted into grain; thus if wheat sells at 16 seers the rupee in *Kátik*, but at 24 seers in *Jeṭh*, the lender gets 30 seers for his 16, or 87 per cent. profit.

Ughái.—Is a form of loan of Rs. 10 to be repaid in monthly instalments of Re. 1 in 12 months. This is "chhoti ughái." Rs. 20 for a loan of Rs. 16 (also repaid at Re. 1 per mensem) is called "lambi ughái." If a man does not pay his instalment he is charged two pice in the rupee on his arrears, or he will serve his banker, being credited with the usual rate of wage against his debt. If a debtor pays off before the term fixed he gets no allowance, the creditor naturally liking long credit.

92. The usual rate of interest is Rs. 2 per cent. per month, and the amount paid is first credited to payment of interest.

93. I have endeavoured to picture the daily life and surroundings of the average cultivator of this district. It is beyond the province of this memorandum to describe the trades, except in so far as they are directly connected with agriculture, as I think I may consider that of the potter, the grain parcher, and the cotton cleaner.

The potter, Kumhár.

94. Potters take three parts clay from the village pond, and one part "pílí" *matti*, which is found in most, but not all, villages a few feet from the surface. As it is wanted it is brought in and pounded well with a mallet (*mongri*), and then sifted through a basket of *arhar* stalks. It is then kneaded (*gúndhna*) with water with the hands, and afterwards with the feet (*khúndhna*). It is then put on a stool (*pírha*) of baked earth, mixed (*rondhna*) with the hands and divided into lumps (*londa*) of five seers each. The wheel (*chak*) is a yard in diameter, thickening from circumference to centre from two to three inches. It is made of the same earth as pots, which is made more adhesive by being mixed with beards of the rice plant (*sikur*). It weighs about two maunds. In the centre of the wheel below a square piece of stone about the size of the palm of the hand, costing six pies, is fastened, with a slight hollow (*ghár*) to catch the peg on which it revolves. The peg (*gaodúm*) is made of well-seasoned tamarind wood, eight inches long, and pointed, and costs three pies (a wheel will last two years, is made in two days, and dries in fifteen). The wheel is caused to revolve by a stick placed in a hole near the edge. This stick is called "chaketi," is a yard long, and is taken out when the requisite speed is obtained.

95. The lump of earth is now placed on the centre of the revolving wheel and the pots fashioned according to will, the hand being kept wet. When the shap (*dhancha*) is worked out it is separated from the wheel by a string. One day's manufacture is put aside in a shady place where the wind comes to half dry (*phararha*). Next morning each pot is stretched and hardened by being patted outside (*garhna*) with a stick (*thápí*) against a ball of hard earth held inside, which is prevented sticking to the half-dried pot by old ashes from the kiln or river sand. The top is patted before the bottom (*penda*), as thinner and drying more quickly: and the pot is put upside down on its mouth to dry. During the above operation the pot is not allowed to touch the ground, but is kept in an earthen platter (*kúnda*). The pot is ready for the kiln in three to fifteen days according to season.

96. Meanwhile water has been prepared (*nitharná*) by being mixed with "pílí matti," which is allowed to settle, and with it red ochre is mixed and spread over the upper half of the pot with a "pochárá." The water makes the colour viscous (*las-dár*): sometimes *babúl* gum is used instead.

The lower half is rubbed with wet "pílí matti," which fills up chinks and rubs off roughness. Patterns are put on the pot whilst tapping and before colouring.

97. The kiln is thus prepared:—Dung cakes are placed in layers at the bottom, and the largest pots arranged in the lowest tier "(tah)" mouth downwards: pots and fuel (*uplá* or *kaṇḍá*) are placed alternately, the interstices being filled with small pots. The whole is covered with *bhúsa*, dry grass (*phús*) and leaves, and plastered over with clay. A hole is left right down the kiln for lighting and draught. The kiln burns two days.

98. The expenses are as follows:—whilst the wheel is at work a second man is absolutely necessary to bring earth, carry off the pots, &c. For a kiln for 100 pots of sizes one rupee's worth of fuel cakes are required; this expense may be saved by the lads of the family collecting (*arná kaṇḍá*) droppings from cattle out grazing. Out of every 100 pots, fifteen will probably be failures (*chhíjna.*)

99. The value of 100 pots of sizes is about Re. 1-11-6.

100. One informant stated that his family consisted of himself, two women, and one child. He could make 1,100 pots in ten days, worth Rs. 7-6-3, meanwhile collecting fuel or purchasing what was required. The pots would weigh nearly 37 maunds. For thirty pots of sizes (16 *matkas*, 8 *gharas*, 6 *hándis*) he would get in the year five seers from the grain heap each harvest and four *chapatis* (one at *Asárh sudi Puranmáshi*, one at *Sáwan sudi Panchmi*, one at *Diwáli*, one at the *Holí*), but from high castes he would get besides five "dábi" weighing two seers at rabi harvest, and heads of *jwár* or *bájra* weighing one seer at kharíf harvest. For the privilege of collecting fuel the potter gives the zamindar as many pots as he wishes in the year.

101. The following are the pots usually made in order of size and value:—

Dahar, for storing grain	...	...	...	...	2	annas.
Naud, for steeping	...	...	...	...	1	anna.
Matká, for water and pickles (holds two *gharas*)				...	3	pies.
Ghara, for water	...	...	...	...	1½	pie.
Hándi, for milk, curds, *ghí*, cooking, &c.			...	...	1½	,,
Karua, for drinking and votive offerings (has a spout)				...	¾	piec.
Dahkena, for drinking	...	...	...	...	2	annas per 100.
Kúnda, flat platter, for kneading in		...	...	...	3	pies.
Rikábi, plate or saucer	...	...	...	...	2	annas per 100.
Díyá, lamp	...	...	...	...	2	,, ,,
Nal, water-pipe	...	...	...	...	3	pies.
Parnála, waterspout	...	...	...	...	3	,,

The grain parcher, *Bhurji* or *Bharbhúnjá.*

102. This useful member of village society is employed by the cultivators in several ways. First as parcher of grain. For this he builds his oven (*bhár*) thus: in a strong room he digs a

trench four feet long, two feet broad, and four feet deep. On the edges of this trench he sets up six *gharas* in couples, of which the necks join, the *gharas* being slanted towards one another. In each of the *gharas* he makes a small hole on the side near the fire to let the heat well in, and a larger hole on the outer side to admit a spoon (*kalchhá*) to take out the sand. The spoon has an iron cup and a wooden handle two feet long: it will hold 2lbs. sand, and costs nine annas. The trench is then closed in, leaving the upper hole in the *gharas* exposed; a hole at the end lets off extra heat and acts as safety-valve. At the mouth of the oven a framework of wood is placed through which the fuel is put in. The fuel consists of all the sweepings of the village streets and the leaves from groves. A man will hire a grove for a year, paying 8 annas per hundred trees, preferring mango trees, as their leaves are heavy, and lie where they fall. As they fall, the *bhurji* collects them into high stacks. Ordinary river sand or the sand brought up in digging wells is used. Near the oven two hollows are made in the ground. In one an earthen pan (*kúnḍa*) is put, in which the hot sand from the *gharas* is first put, and the grain put on it and mixed. Taking up handfuls of mixed sand and grain, the *bhurji* separates the former from the latter through a bamboo sieve; some grains are parched more than once. For this purpose some of the *gharas* near the door are kept less hot, so that the grain is first given a half parch (*kalhárna.*) The parcher is paid in cash half-pice per seer, or in grain three or four chittacks.

103. The following grains are usually parched:—

Gram is parched twice, and is eaten simply parched or split ("deoli"); it sells at fourteen seers the rupee.

Wheat is parched twice, and mixed with "gur" is made into cakes called "gurdháni."

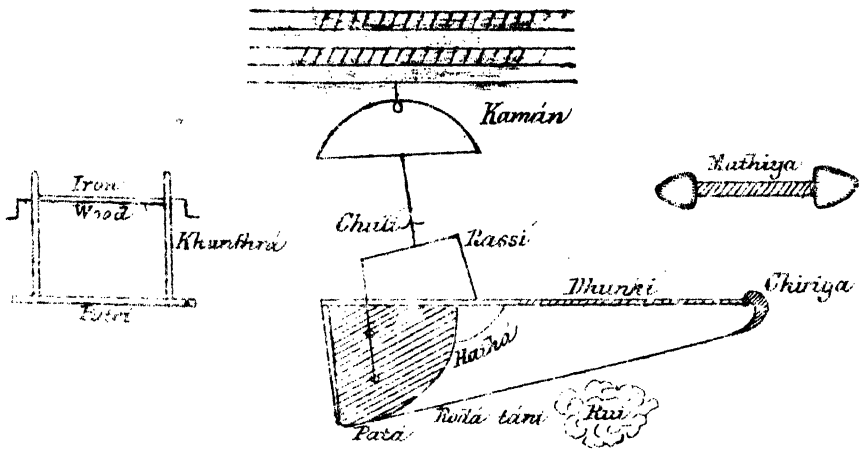
Barley is parched twice, mixed with much sand. For mixture with gram-flour (called "sattu") barley is prepared by being first wetted, half dried (*pharahra*), pounded in a mortar, and then parched.

On every 11th day of the month the oven is closed, and on "Sheobart" (*Phágun badi teras pája*) is performed with water, rice, flowers, and *ghi*.

104. The *bhurji* also extracts his castor oil for the cultivator. First slightly warming (*kalhárna*) the seeds in a potsherd, he pounds them in a stone mortar (a wooden one would absorb the oil). The pounded seed (*lugdi* or *khaḍwe*) is then thrown into pots of hot water, when the oil floats to the surface and the refuse falls to the bottom. The oil is then skimmed off, and is obtained in the proportion of one-third of gross weight. The *lugdi* is used as fuel.

Cotton-carder, *Dhunia* or *Behna.*

105. The tools with which the cotton-carder works will be best understood from the following sketch:—



106. The "dhunki" is of *dhúp* wood, and is thicker at one end than the other. The nob (*kushia* or *chiriya*) and bridge (*pata*) are of *nim.* They cost altogether Re. 1-4-0, but last twenty-five years. The string ("tánt") is of leather, double. This costs 1½ anna, and often requires renewing. The bridge is protected by camel-skin pads, the nob by a band of iron costing about 1 anna 3 pies. The plectrum ("muṭhia") is of tamarind wood, the bow (*kamán*) of bamboo, with leather cord. It is fastened to the roof of the house, and is attached to the carding-bow by strings of leather, keeping the latter about one foot from the ground. By the flexibility of the "kamán" the carding-bow bends and gives. Holding the *dhunki* in his left hand, the carder places a heap of cotton near his right hand under the string, and striking the *tánt* with the "muthiya" separates the fibres. When a heap (*gola*) of about 4 oz. is clean, he puts it aside, collecting the cotton with a ("gaz") yard. A man will card 2 lbs. cotton in three hours; but it is such exhausting work that he will only work five or six hours. He is paid an equivalent weight of grain (but never wheat) to the cotton carded. As this work generally is in hand from October to January, payment is generally made in *jwár.*

107. The cotton-carder also spreads the cotton in jackets or quilts that are to be stuffed, getting one pice per jacket, and two pice for a coat or razái; but the less cotton the higher charge, and for fine work as much as 12 annas or Re. 1 is charged.

108. As the carder only gets carding work in the winter months he cannot make a living out of it, so he keeps a cotton-gin, "rentha" or "charkhi." This primitive machine is either one-handled or two-handled. The gin consists of two uprights (*kunthra*) on a piece of board (*patri*). Two rounded rods, one of *babúl*, the other of iron, are fixed in the upright, handles being attached. The cotton being placed between the rods, the handle or handles are turned and the seed pressed out. The price of a "charkhi" is 8 or 9 annas. The charge for cleaning a maund of cotton (*kapás*) is Re. 1 or Re. 1-4-0 and the seeds (*binola*). The average outturn is two-thirds seed to one-third cotton of gross weight. To clean ("oṭna") 15 seers of cotton (*kapás*) is a good day's work.

Cattle.

109. The following breeds of cattle are most in demand amongst the agricultural classes for purposes of husbandry :—

Country (*Desi*), bred from the ordinary country cow, covered generally by some bull (*sánḍ*) which has been let loose at a death, wanders loose about the country, and mixes with the herds out to graze. This breed is generally small in stature, dun-coloured, worth only Rs. 10 or Rs. 12, and lasts but five or six years.

Jamneit, or from beyond the Jumna, generally red and of medium stature, worth Rs. 15 or Rs. 16, and lasts for 15 or 16 years.

Kanwaria, from the Ken river (Bánda), red in colour, but white fronted, fetches as high as Rs. 30 or Rs. 35, but only lasts 15 or 16 years. A strong breed.

Painthua, from the Gogra (the name is derived from an old legend that they were only bred in 35, *painthis*, villages), a long-horned breed, rather wild, last 12 or 13 years, and fetch Rs. 20 or Rs. 25.

Hariánth, from Hariána, a slow breed, and only working for 10 years; fetches Rs. 13 or Rs. 14.

Mewát, a short-horned breed of some stature, but heavier in hinder quarters; a good worker, lasting for as long as 20 years, and fetches Rs. 20 or Rs. 25.

Bhadáwar, from the Bhadauria country, a slow, poor, rough breed, only fetching Rs. 10 and lasting 5 years.

110. The four first named are the breeds most commonly in use in this district. Country cattle are not castrated; the other three breeds are to tame them; hence also they last longer.

111. The country-bred cattle may generally be bought at the Bindki or Burhwán (in Fatehpur) markets. In this district the principal cattle markets are at Makanpur, twice annually; Gajnair, once annually, in June (at these fairs high priced cattle are sold for carriage); Chaubepur, Sen, Asálatganj, Barei-Garhu, Satmarra, Pokhráen, Bari Pál, and Daulatpur, bi-weekly.

To these villages they bring their home-bred calves or their worn-out cattle, which some hapless cultivator who cannot afford more than three or four rupees will buy to carry on with. (The cultivator rarely gives above Rs. 15 for an ox, buying young if possible.)

112. Besides these opportunities for purchase, *Banjáras* come from April to June "from the west" with herds ("heṛi") of two-year-old cattle of west country breeds, and travelling eastwards, sell as they go, taking only earnest-money, and leaving the balance due unprotected by any note of hand, &c. But when they return in November and December they alight at the door of their debtor in such numbers that he is glad enough to pay them up and get rid of visitors who will eat him out of house and home, if they do not insult himself and family.

113. Country-bred buffaloes are much used by those who cannot afford better cattle, as they cost but Rs. 10 at the outside: they last about ten years. Till lately Brahmans and Thákurs had a prejudice against using this animal, which is giving away under the pressure of poverty.

114. Country-bred cattle have their nose pierced by chamárs when they have two teeth; the incision is kept open by a string of *múnj* grass, which by its roughness does not adhere to the wound. The chamár is fed on the occasion of the nose-piercing.

115. The country cattle are much in demand across the Ganges, as their small stature fits them for the light soils prevalent there, and they are not wanted for irrigation, which is said to be carried on chiefly by "dhenklis."

116. Ahírs are the principal cattle breeders, but as far as possible every cultivator keeps a cow or buffalo, and rears or sells the calves.

Keep of cattle.

117. The cultivator can generally feed his cattle on the produce of his fields, eked out in some months by grass and "hariyáli," or a mixture of green food containing grasses, weeds, leaves, or whatever comes to hand. Thus in October there is "chari," *jwár* grown thick for fodder, and cut green; in November bájra "karb" is to hand, or tops of the hemp plant; in December to March *jwár* "karb" is plentiful, and is cut up and mixed with *seohán*, *sarson*, &c. (called "kaṭiya"); from March to April, if the "karb" is finished, the cattle are rather pinched, but sufficient "bijhra" to keep them alive is cut green and given them till the crops are down, when the cattle graze amongst the stubble. In April, May, and June there is plenty of *bhúsa*, whilst for July to September there is grass enough and to spare.

118. Thus if an acre of *jwár* gives seventy bundles of "karb," averaging twenty-five seers a-piece, the ordinary quantity of food given to a full-grown working ox being ten seers (or a little under), the acre of *jwár* will provide food

for a pair of oxen for nearly three months, and an acre of wheat or *bijhra* giving twenty-eight maunds of *bhúsa* will support a yoke of oxen for nearly two months. For a milch cow or buffalo, besides cut grass, &c., cotton-seeds (*binaulá*) and *khalli* are necessary in the cold weather.

119. The favourite herbs for cattle, and which are mixed in "hariyái," are :—

Gobhi—(hieracium ?)

Bathui—(chenopodium album, white goose-foot?) also a favourite pot-herb eaten as greens.

Bondi.

120. The best grasses are *jankari* and *musel* or *gandhel*, which give two cuttings in the year and are carefully guarded in groves, &c.

121. A milch buffalo is a great help to a cultivator, often paying the rent like the Irishman's pig. A good cow will give four seers milk a day, from which two seers *ghí* will be made in the week, selling for Re. 1 at the nearest market. It is a common custom to agree with a mahájan to supply so much, say a maund of ghí in the year, taking an advance on it. The mahájan credits the cultivator with the ghí received, taking at the rate of one and a quarter seer for one seer. The buttermilk and fuel cakes must be reckoned in estimating the profit from a buffalo.

122. A piece of tortoise-shell or the wood from the socket of the flour-mill is hung round the neck of a milch cow to avert the evil eye: great, too, is the fear of an enemy bewitching the cow, and charms and incantations known only to Ahírs and Gareriyas are resorted to ; whilst at an eclipse the cow in calf is rubbed on the horns and belly with red ochre to secure an unblemished offspring.

123. Non-agriculturists pay an Ahír (*gwálá*) or Gareriya 8 annas a year for a buffalo, 4 annas for a cow, and 2 annas for a goat to take them out daily to the "hár" to graze. Zamindárs generally get this done for nothing. In addition to this, the gwálás of a village collect after the Diwáli festival (when Goberdhan, *vulgo* Gordhan, is worshipped in the form of a little heap of cowdung decorated with pieces of cotton), and go round to the houses of those whose cattle they graze, and to the music of two sticks struck together and a drum (beaten by a *Kori*) sing rude melodies and get presents of cloth, grain, or pice. This is called *ḍáng* (a club) *Diwáli*. A fee of two pice is also claimed, *Sáwan badi Daj*, for every cow brought to graze, called "merwái," supposed to repay the extra trouble necessary in the rains to keep the cattle off the field boundaries (*merh*). Every day the *gwálá* milks a buffalo he gets a *chapátti*, and every other day for a cow.

Trees.

124. I add here a short notice of the most useful trees found in the district:—

Babúl—Acacia Arabica—is generally self-sown in culturable waste land. Its wood is hard and durable, and used for nearly every agricultural implement, as well as for cart wheels. It is also burnt for charcoal. The bark is largely used in tanning, and also in distilling spirits. The smaller branches are used for firewood, and the twigs are made into toothbrushes. The gum is collected, and the leaves and pods are a favourite food for goats and camels, and have also medicinal properties. A tree will be fit for cutting in ten years, and be worth, according to size, from Rs. 2 to Rs. 10. There is no more generally useful tree, and every encouragement has been given to zamindars to plant it, as the leaves, &c. (and the droppings of the animals that feed on it), falling on the ground gradually fit it for cultivation.

Shisham (*Sissu*).—Chiefly valuable for the wood, which is flexible, and therefore used in making "raths, bailis," and especially for furniture, as taking a good polish. It is fit for use after twelve years, and will fetch Rs. 5 or Rs. 6, every year adding to its value. It attains considerable age.

Nim is useful, both young and full-grown. The peculiar bitter properties of the wood which protect it against the ravages of the white-ant make it valuable for doors, doorposts and lintels, bed frames, &c. It is thickly planted in coppices to obtain straight scantlings for building. The twigs are used for toothbrushes. The bark has medicinal properties, and is applied to boils, and the tender inner bark is soaked and given as a febrifuge. The leaves are eaten by camels and goats, and sprinkled amongst cloths to keep out insects, or made into a plaster are put on boils as a poultice, or over an eye affected with ophthalmia, or a decoction is drunk as a blood purifier. The seeds are collected and oil is expressed on the usual terms. The tree is full grown in twelve years, after which the inner wood decays. A full-grown tree will fetch from Rs. 4 to Rs. 6. From some trees water (*nim-jal*) distils, which is most valuable as a blood purifier.

Dhák—Butea frondosa—grows wild. The wood is a common fuel, its irregular growth unfitting it for other uses. The leaves are made by the "bári" into cups and plates, fastened by a splinter of the *nim* tree. The flowers yield the dye used in the *Holí* festival, and the gum is used medicinally and to fix mudge and other dyes. It is fit for use, and is generally cut every third year. The roots, being fibrous, are made into ropes.

Mahua—Bassia latifolia—is a cultivated tree, and takes the place of the mango in the southern or drier parganas of the district, as it does not require so much moisture. The wood is used for general purposes, but

especially in boat-building. Charcoal is also made of it. From the flowers spirit is distilled, and from the nuts oil is expressed, much in use as a liniment in rheumatism.

Gúlar—Ficus glomerata—is planted in small numbers. Its wood is soft and useless, except to burn, and, as it decays slowly in water, for the special purpose of lining wells or making the framework on which the brick cylinder is constructed. The fruit is eaten unripe as a vegetable or ripe, but it is liable to get full of maggots ; fetches one pice a seer. The milk is used as birdlime or medicine for coughs. It is full grown in ten years, and will sell for as much as Rs. 5.

Jáman is also a tree planted occasionally ; it requires much moisture, but its shade is thick, so it is often planted near wells. The wood, like that of the *Gúlar*, resists the decaying effect of moisture, and is therefore used for well-linings. The fruit, a kind of sloe, is eaten, or its juice distilled into vinegar. The tree is full grown in ten or twelve years, and will fetch as much as Rs. 5 or Rs. 6 when 20 years old. The fruit of one tree will fetch as much as Rs. 5.

125. The above are the most common trees found in the district, and the cultivation of which is most profitable. The following are occasionally found, and have their special uses :—

126. The fruit of the *bel* possesses useful medicinal virtues, especially for diarrhœa ; it is also eaten roasted. The leaves are offered at the shrine of Mahadeo ; hence the tree is used for nothing else, but when dry is sold for firewood, fetching about Rs. 3 or Rs. 4.

127. The fruit of the *kaithá*, *kachnár (bauhinia)*, *aonlá (phyllanthus emblica)*, and *karíl* (wild caper) is used for pickles and " chatnis ;" and the leaves of the *kaithá* are used as a poultice on festering wounds, whilst the fruit of the *aonlá* (*myrobolan*) is much used in dyeing.

128. The wood of the *siris*, *arjan*, and *amli* or tamarind is much used for sugar-presses (*kolhu*), and the wood of the ber (*zizyphus jujuba*) and the *labhera* is valuable, especially for bedframes ; the wood of the latter being light, it is also used for sword sheaths and panels of palanquins, as is that of the *arru*.

129. The *chenkur*, *reonj*, and *suhora* are jungle trees. Goats, &c., eat the legumes, and the wood, if the tree grows large enough, as it rarely does, is useful for oil-presses, when it is worth Rs. 3 or Rs. 4, or for charcoal.

130. The pípal (*ficus religiosa*), *bargad (ficus Indica)* or banyan tree, *pákar (ficus venosa)* cannot be considered useful trees, though their leaves are used as fodder for elephants, their milk as medicine or birdlime, and their wood for burning.

131. The mango calls for more detailed mention. It is generally planted in groves in regular order, scattered here and there in *good* patches of waste land, or round ponds; it is indeed generally sown by preference in lowlands, as it requires much moisture, and is therefore much more rarely grown south of the Sengar, where the *mahua* takes its place. The seed is sown in nursery beds (*kyári*), and the young tree is planted out when two years old, two or more being included in the same "thápi" or ball of earth. It must be watered for the first four years; hence a well is often constructed for the purpose, and a *Káchhi* settled in the grove to look after the trees and support himself on what he can grow. The young tree flowers (*bor ánd*) in its fifth year; any fruit that forms soon falls off unripe. The fruit that forms in the sixth year and thenceforth ripens, but as long as it is small it is usually made into *chatni*.

132. The wood is most commonly in use for boxes, cupboards, and all woodwork. It is, however, an inferior wood, having only its cheapness and some degree of lightness to recommend it; a tree is in its prime when thirty years old. The leaves are hung over doorposts at weddings and festivals, and are also made into plates for the bridegroom, who is expected to put a present on them; a branch is offered at sacrifice.

133. Amongst Hindús the fruit takes the place of the English apple; it is used for numberless forms of sweetmeat, &c. The unripe fruit is cut in two, dried in the sun, and stored as *khaṭái*, or *amchur*. Fallen fruit (*ṭapaka*) is made into pickle or stored dry. Sometimes the fruit when first ripe is plucked with a portion of the branch attached and preserved in honey, in which it remains quite fresh for a year. The stone is eaten like a chestnut by the lower classes. The ripe fruit is sold at about a thousand for the rupee, but the custom is to give ten over the hundred (the baker's dozen), which ten are called "pachotra."

134. Groves are *married*, but by proxy; that is to say, the sáligrám is married to the tulshi plant (representing the *bágh*) with the precise ceremonies, social and religious, as are observed in the ordinary marriage of human beings. All relations are collected, and a relation on the woman's side of the family (*sálá*, *sasur*, &c.) represents the bride, the owner of the grove representing the bridegroom. Gifts are given to Bráhmans, and the guests are feasted in the *bágh* itself. It is not necessary to celebrate the marriage of a grove, but a man will not spend less than Rs. 15 or Rs. 20 in doing so.

135. In conclusion, I am well aware of how incomplete the foregoing memo. is, but I claim for it at least this merit,—that, as far as possible, every statement or figure has been verified by experiment, or where there has not been opportunity for this, by constant and searching enquiry for the last four

months. In such intervals as could be spared from other duties, this outcome of six years' settlement work has been elaborated and corrected, and references have been made to botanical or scientific works, as well as Elliott's Supplemental Glossary. It has been difficult to avoid being too prolix, and I have still at hand much matter, such as proverbs, omens, or other superstitions and customs, which I have not recorded. But I would delay the submission of the memo. no longer; only hoping that I may still have an opportunity of adding further information as it becomes available.

CAWNPORE,
The 26th February, 1877.

F. N. WRIGHT,
Settlement Officer.

N.-W. P. AND OUDH GOVERNMENT PRESS, ALLAHABAD.

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